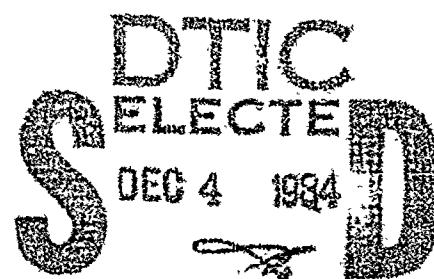


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**Moscow's Lessons from
the 1982 Lebanon
Air War**

Benjamin S. Lambeth

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PROJECT AIR FORCE

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Benjamin S. Lambeth

September 1984

**A Project AIR FORCE Report
prepared for the
United States Air Force**



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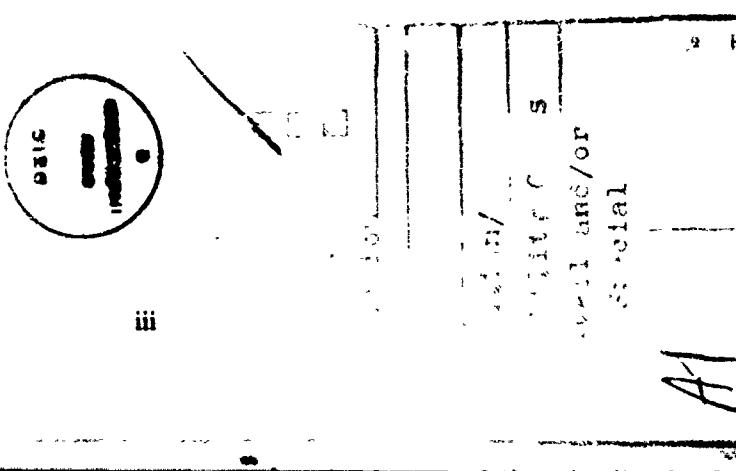
This Report reviews Soviet impressions of Israeli air operations during the 1982 Lebanon war. It evaluates a 1983 article published in the Soviet Air Force monthly (whose audience includes Soviet airmen), that assesses the implications of the Israeli-Syrian air battles. For Western audiences, the article provides insights into how the Soviets have interpreted the Beka'a Valley experience. It appears that the Soviets have either deliberately misrepresented Israel's air combat results to their own pilots or else failed to comprehend the tactical lessons suggested by Israeli combat performance.

PREFACE

The Rand Corporation is providing analytical support to the Assistant Chief of Staff/Intelligence, Hq USAF, on a variety of subjects of concern to the Air Force. This report is a contribution to that effort. It was inspired by a recent issue of the Soviet Air Force monthly, *Aviatsiia i kosmonavtika* (Aviation and Cosmonautics), which featured a two-part commentary on air operations in the June 1982 Lebanon war. Unlike most material in that publication, this item seemed interesting enough to warrant a closer reading. The result persuaded the present author to translate the piece so that its contents might be shared with a wider audience. The article offers numerous insights into the way the Soviets have interpreted (and, in some cases, misinterpreted) the operational implications of the Beka'a Valley experience.

This report presents a full translation of that article (see Appendix), along with a detailed analysis that evaluates its conclusions against the backdrop of actual combat events over Lebanon and the Soviet propaganda depiction of the war. The translation reflects a best attempt to convert the Soviet writer's convoluted Russian into digestible "fighter pilotese." Nevertheless, it retains much of the stilted quality characteristic of Soviet military writing. Likewise, the section on the Beka'a Valley ventures a best effort to reconstruct Israeli operations from available open-source materials. Given the incomplete and unconfirmed nature of so much of that "evidence," however, the author lays no claim to offering a definitive account of what actually took place. Readers with more authoritative knowledge will know where the discussion is right or wrong on specific points of interpretation. In all events, its intent is merely to provide enough background on the basics to permit an educated reading of the Soviet article.

This work was supported by a concept-development project under Rand's Project AIR FORCE research program on National Security Strategies. It should be of interest to Air Force officers concerned with fighter tactics development, Israeli air combat experience, and trends in Soviet tactical air warfare capability.



SUMMARY

The September and October 1983 issues of *Aviatsiya i kosmonavtika*, the Soviet Air Force monthly, featured a two-part article by Colonel V. Dubrov on Israeli air operations in the Lebanon war. In contrast to routine Soviet propaganda, this discussion is a dispassionate rendering of combat events. Its author is a prominent Soviet spokesman on air warfare. His intent is to identify the main tactical innovations employed by the Israeli Air Force (IAF) and offer appropriate operational conclusions to Soviet aircrews.

Dubrov cites the following as the most notable lessons of interest from the Beka'a Valley experience:

- The increased freedom of maneuver gained by detaching air superiority fighters from direct escort of strike formations and putting them in separate combat air patrols.
- The vulnerability of airborne command posts to enemy fighters and surface-to-air missiles (SAMs).
- The value of communications and radar jamming for destroying enemy situation awareness.
- The ability of fighters with extended-range radars to operate in a tactical Airborne Warning and Control System (AWACS) mode.
- The diminished reliability of radar control over fighters as the depth of air operations into enemy territory increases.

All these points have relevance to Soviet operations planning for Europe and other theaters. Their appearance in Dubrov's analysis suggests that they may be topics of more extensive debate within the Soviet fighter community.

Of greater interest are those aspects of the Lebanon war left unmentioned by Dubrov. For all his consideration of formations, ingress techniques, and related operational matters, he does not address the IAF's attack on Syria's SA-6 sites in the Beka'a Valley. He is also silent on the Syrian Air Force's extensive MiG losses. Despite his professional tone and the unusual detail he provides, Dubrov is obviously not telling Soviet aircrews the whole story. Indeed, it is possible that he himself does not know it.

Dubrov severely misconstrues the Lebanon air experience on two counts. First, in discussing combat air patrol techniques, he exaggerates the importance of the Israeli E-2C and wrongly insists that

offensive fighter sweeps are impossible without the support of airborne control platforms. His tendency to regard AWACS aircraft as little more than airborne Ground-Controlled Intercept (GCI) sites may reflect the traditional Soviet obsession with control. Whatever the case, it misinterprets the way the IAF employed its E-2C and overlooks the considerable autonomous search capability of the F-15. This suggests that the Soviets may not be in a hurry to abandon their traditional reliance on GCI close control in favor of more independent operations, even after they acquire the MiG-29 and SU-27 in large numbers.

Second, Dubrov is fundamentally off the mark in his treatment of all-aspect missiles. He notes that Israeli forward-hemisphere attacks were the exception to the rule. From this, he concludes that the all-aspect threat does not yet warrant any changes in Soviet training and tactics. It may be true that the IAF took only a few front-aspect shots against the Syrians with the AIM-7F and AIM-9L. Nevertheless, both missiles can be employed effectively in that manner. If Soviet pilots genuinely believe and are prepared to act on what they have been told by Dubrov, this can only come as good news to their American and NATO counterparts.

All in all, the Soviets are as capable as we are of reading the technical results of the Lebanese war and drawing appropriate technical conclusions. Yet they may have been less successful in comprehending the larger significance of the Beka'a Valley outcome. In the end, the Syrians were not defeated by any particular Israeli weapon or combination of technical assets. What made the critical difference was the IAF's constant retention of the initiative and its clear superiority in leadership, organization, tactical adroitness, and adaptability. This is the overarching "lesson" of enduring merit from the war—and the last one the Soviets seem close to recognizing and assimilating.

None of this should be read as an excuse to underestimate Soviet military power. Because of their quantitative strength, offensive proclivities, and apparent indifference to attrition, the Soviets have the capacity to create major problems for NATO, *whatever* tactical weaknesses they may suffer at the unit level. Nevertheless, the notion that "you fight like you train" applies to the Soviets no less than it does to ourselves. However impressive the emerging Soviet tactical air posture may appear on paper, the individual Soviet pilot has a considerable way to go before he will be able to employ that equipment to its fullest potential.

ACKNOWLEDGMENTS

This report began as a routine translation of a Soviet article for interested members of the fighter community. It quickly expanded in ambitiousness as my research drew me deeper into the Bekaa Valley story and Moscow's reaction to it. In the process, I benefited from the support of many people.

I am first grateful to Maj. Gen. James C. Pfautz, Jr., Assistant Chief of Staff/Intelligence, Hq USAF, for encouraging this undertaking. I am also indebted to Lt. Gen. John T. Chain, Jr., Deputy Chief of Staff/Plans and Operations, Hq USAF, who has been a consistent sounding board for my work over the years and who gave generously of his time on several occasions to discuss this subject with me.

From the working level, I have received feedback from far more readers than I can readily account for here. Some must remain nameless in any event. Among others who have been of assistance in various ways, particular mention is due Col. Howard Moss, Lt. Col. Barry Watts, and Majs. James Hale and John Lieberherr of the Directorate of Operations, Hq USAF; Col. Phil Gardner, Maj. Ed Singer, and Capt. Kevin Roper of the Directorate of Estimates in AF/IN; Col. Joe Merrick and his staff at the USAF Fighter Weapons School, Nellis AFB; Capt. Rana Pennington, Defense Intelligence Agency; Mr. Raymond Ennis, Central Intelligence Agency; Dr. Dennis Ross, Deputy Director of Net Assessment in the Office of the Secretary of Defense; and Lt. Sandy Winnefeld at the Navy Fighter Weapons School, NAS Miramar. All read the manuscript and provided helpful comments within the limits permitted by the sensitivity of the subject.

Of my Rand colleagues, Chris Bowie and Lt. Col. Roger Hill (our research associate from AF/IN) volunteered suggestions on numerous technical points. Luba Fajser helped me through the rougher parts of the translation. And Felix Kozaczka and Punch Jamison, both former fighter pilots, offered incisive peer reviews.

Finally, this is an appropriate place to express my special thanks to the Tactical Air Command, National Guard Bureau, Air Force Reserve, U.S. Navy, and Canadian Forces for having allowed me to fly periodically on enough fighter sorties of diverse types since the mid-1970s to give me at least basic conversancy in tactical air matters. Without that experience, I could not have written either this report or much of my previous Rand work on similar issues. I am grateful to all, both those in the approving chain and the many able pilots with whom I have flown, for the opportunity I have had to further my education in this irreplaceable way.

CONTENTS

PREFACE	iii
SUMMARY	v
ACKNOWLEDGMENTS	vii
ABBREVIATIONS	xi
Section	
I. INTRODUCTION	1
II. HIGHLIGHTS OF THE BEKA'A VALLEY	
AIR CAMPAIGN	4
The SAM Suppression Phase	5
The Air Battles	8
Overview	10
III. EARLY SOVIET REACTIONS TO IAF COMBAT SUCCESSES	12
IV. INSIGHTS AND OVERSIGHTS IN THE DUBROV ARTICLE	18
Lessons Learned	19
Lessons Mislearned or Ignored	22
V. CONCLUSIONS	28
Appendix	35

ABBREVIATIONS

ARM	Antiradiation Missile
AWACS	Airborne Warning and Control System
BVR	Beyond Visual Range
CAP	Combat Air Patrol
CBU	Cluster Bomb Unit
CPSU	Communist Party of the Soviet Union
ECM	Electronic Countermeasures
ECCM	Electronic Counter-Countermeasures
ELINT	Electronic Intelligence
EOB	Electronic Order of Battle
GCI	Ground-Controlled Intercept
IAF	Israeli Air Force
IDF	Israeli Defense Forces
NATO	North Atlantic Treaty Organization
PGM	Precision-Guided Munitions
PLO	Palestine Liberation Organization
RPV	Remotely Piloted Vehicle
SAM	Surface-to-Air Missile
TASS	Telegraph Agency of the Soviet Union

I. INTRODUCTION

The September and October 1983 issues of *Aviatsiia i kosmonavtika* (*Aviation and Cosmonautics*), the monthly periodical of the Soviet Air Force, featured a two-part article by Colonel V. Dubrov entitled "Aviation in the Lebanon Conflict." (A full translation is attached to this report as an Appendix.) Published more than a year after the devastating Israeli Air Force offensive against Syrian SA-6s and MiGs over the Beka'a Valley in June 1982, this article is the first sustained treatment of the Lebanese air war to have appeared in the Soviet literature. The only commentary on those events that had previously been made available to Soviet readers was routine Soviet propaganda excoriating Israel's "air piracy" and grossly distorting its portrayal so as to reflect favorably on Syria's performance. Dubrov's article, by contrast, offers a more dispassionate and professional treatment of combat events, with the avowed purpose of highlighting the various tactical innovations they encompassed and drawing appropriate operational conclusions for Soviet aircrews. Although it repeatedly cites "foreign military observers" and "the foreign press" (a common Soviet usage when sensitive topics are being discussed), his article appears to contain a good deal of material that does not derive from the Western literature. This suggests that Dubrov's remarks indeed reflect, at least in part, independent Soviet impressions and interpretations.

It is noteworthy that Colonel Dubrov wrote this product. He is plainly a prolific Soviet commentator on aerial warfare matters. Many USAF readers will recognize him immediately as the author of the earlier *Aviatsiia i kosmonavtika* series entitled "How Has Air Combat Changed?"¹ That series continues to stand as one of the most thorough and up-to-date Soviet open-source discussions of air-to-air combat theory and practice. Its publication established Dubrov as a prominent Soviet Air Force spokesman on air combat tactics development.

Why did the Soviets take so long to produce this "professional" rendition of the Lebanese air war (as opposed to the usual propaganda caricature)? Numerous high-level Soviet teams had long before visited

¹These articles, published in 1978, deal successively with the search, closing, attack, maneuver, and disengagement phases of an air battle. In consonance with well-known Soviet operational practice, they place heavy stress on the importance of GCI directives in shaping the contours of the engagement. Full translations may be found in *The Soviet Awareness Red Eagle Reader* (Washington: Directorate of Soviet Affairs, U.S. Air Force Intelligence Service, 1980), pp. 39-79. For a brief condensation, see *USAF Fighter Weapons Review*, Spring 1981, pp. 23-27.

Syria to gather combat data, beginning with the delegation led by Colonel General Yurasov that arrived in Damascus only four days following the Beka'a Valley shootout. A plausible answer might be that the Soviets were so perturbed by the poor showing of their weaponry in Syrian hands that it took them that long to arrive at an agreed interpretation to communicate to their own people.

Perhaps a better question might be why the Soviets felt obliged to comment on Israeli air employment in Lebanon at all. There is no doubt that they were embarrassed severely by the defeat the Israelis dealt the Syrians as a result of their superior equipment, tactics, and pilot proficiency. Given this deep-seated Soviet sensitivity, might it not have been easier just to let the whole sorry episode go unmentioned?

The problem with this approach almost certainly involved an abiding uneasiness at the highest echelons of the Soviet Air Force as to whether rank-and-file Soviet officers would long believe the propaganda line they had been fed in the wake of the Beka'a Valley campaign. It is no secret among Soviet fighter pilots that the Syrians are anything but accomplished air tacticians. The operational prowess of the Israeli Air Force is equally well known. Given the widespread appreciation of this reality that underlies the cover story Soviet audiences are routinely told about the Middle East air balance, the initial wave of propaganda that so blatantly misrepresented Syrian combat performance must have met with disbelief on the part of many thoughtful Soviet military personnel.² When one further considers how fast rumors tend to spread in a country like the Soviet Union where information flow is so tightly regimented, one can imagine the pressures the Soviet Air Force must have felt to put forward at least *some* "official" accounting of what happened in the skies over Lebanon in June 1982—if only to help offset the corrosive effects of uncontrolled gossip.

This report describes how the Soviets have presented the Lebanon air war to their own pilots. Dubrov's article may or may not accurately reflect the more fine-grained impressions privately drawn by high-level Soviet officials from their battle data collection in 1982. It does, however, embody the perspective the Soviets have chosen to convey for

²There is good reason to suspect that Soviet pilots routinely dismiss much of what they hear from the propaganda mill. In this regard, Lieutenant Viktor Belanov (the former Soviet Foxbat pilot) recounted having been told once by his superiors at the Armavir flight school that USAF "Wild Weasel" pilots were willing to fly on SAM suppression missions over North Vietnam only because they were either well-paid mercenaries or under the influence of narcotics. He said he believed neither story and instead felt nothing but admiration for those aircrews. John Barron, *MiG Pilot* (New York: Readers Digest Press, 1980) p. 157.

broader consumption. As we shall see, it is an image largely devoid of routine ideological fulmination. Nevertheless, it remains highly selective in the events it reports and is pervaded with glaring omissions and occasional gross misrepresentations. Furthermore, some of the key "lessons" it cites from its given examples of Israeli force employment appear to be fundamentally misconstrued. Is Colonel Dubrov, knowing better, holding forth a purposely skewed account aimed at reassuring his readers? Or has he genuinely misinterpreted the significance of the Israeli weapons and tactics employed by looking at them through the distorting lens of Soviet military style? We will speculate on this question below. Before turning to the Dubrov article directly, however, it would seem worthwhile first to present the actual highlights of Israeli air combat over Lebanon as best we can from available evidence, and then review the Soviet propaganda depiction of that combat which preceded the publication of Colonel Dubrov's account.

II. HIGHLIGHTS OF THE BEKA'A VALLEY AIR CAMPAIGN

Any attempt to reconstruct Israeli air operations over Lebanon must first recognize that the Israelis have treated this subject as highly classified and have said little in public about what actually happened. Because of this circumspection, available information is both fragmentary and inconsistent, leaving us with no reliable way of distinguishing fact from hearsay and opinion.

The Israeli Defense Force (IDF) has always been extremely security-conscious. Indeed, we cannot rule out the possibility that much of the press comment that has appeared on the Beka'a Valley operation has been a product of intentional Israeli disinformation, both to protect the more sensitive aspects of IAF operational tactics and perhaps also to exaggerate the image of Israel's combat prowess for its psychopolitical effect. Nevertheless, there is enough evidence—starting with the more obvious results of the campaign and the well-known array of equipment the IAF had at its disposal—for us to assemble at least a rough-order portrait of how events probably unfolded.

To summarize the origins of the conflict, an assassination attempt in May 1982 against the Israeli ambassador to London (which left him gravely wounded) prompted limited Israeli retaliatory strikes against Palestine Liberation Organization (PLO) positions in southern Lebanon. This action, in turn, triggered intensive PLO shelling against Israeli civilian settlements in Galilee and further occasioned a substantial reinforcing of existing Syrian SA-6 missile emplacements in the Beka'a Valley, the first of which had been deployed to Lebanon on April 29 the previous year.

Using these developments as a pretext, the IDF on June 6 launched what it labeled "Operation Peace for Galilee," a massive combined-arms assault intended to destroy the PLO as a military force and neutralize any Syrian combat assets in Lebanon that might interfere with that effort.¹ The air portion of this campaign began three days later with a coordinated surprise attack against the Syrian SA-6 network in the Beka'a Valley. This was immediately followed by an intense aerial

¹For a thorough, if sympathetic, description of the Israeli rationale for this operation, see Avner Yaniv and Robert J. Lieber, "Personal Whim or Strategic Imperative? The Israeli Invasion of Lebanon," *International Security*, Fall 1983, pp. 117-142. A more critical account is offered in Amos Perlmutter, "Begin's Rhetoric and Sharon's Tactics," *Foreign Affairs*, Fall 1982, pp. 67-83.

showdown between Israeli and Syrian fighters, in what has been widely acclaimed as the largest single air battle since World War II.

THE SAM SUPPRESSION PHASE

For understandable reasons, the IAF was strongly inclined to destroy the Syrian SA-6 sites immediately upon their initial emplacement in April 1981. That departure from the status quo was typical of the ambiguous enemy provocations that have routinely caused the IDF to agonize over whether to preempt decisively and accept the ensuing diplomatic consequences or else tolerate the provocation and perhaps incur a long-term military disadvantage as a result. In this case, the IAF was probably torn between a natural desire to take prompt action and concern that by doing so, it might compromise its SAM-suppression tactics that could prove critical to Israeli success in a later and more serious confrontation with the Syrians.² The issue was resolved in favor of attacking, and the Begin government authorized the IAF to proceed with mission planning. Before the operation could be carried out, however, a heavy cloud cover moved into the target area and obliged the IAF to wait. By the time the weather cleared, U.S. diplomatic efforts to mediate the conflict had begun in earnest. This forestalled any immediate resumption of strike preparations.³

The resultant delay gave the IAF over a year to amass tactical intelligence on the Syrian SA-6 positions and refine its attack plans.⁴ The latter included, by some accounts, extensive rehearsal sorties against simulated SA-6 sites in the Negev desert.⁵ Once the day of the strike arrived, the IAF commanded an excellent threat picture, a cadre of highly experienced and well-prepared aircrews, and a tactical repertoire precisely tailored to the operational situation.

²See John Yunna, "Those SAM Missiles in Lebanon—Why Israel Would Be Willing To Risk a War To Get Them Out," *Christian Science Monitor*, May 15, 1981.

³The IAF had been poised on April 30 to attack the three Syrian SA-6 batteries that were then in Lebanon but was forced to postpone the mission three times in four hours because of weather complications. Prime Minister Begin later noted that the strike would have occurred the following day had the United States not appealed for a delay. See David K. Shipler, "Begin Says Syrians Have Increased Missiles in Lebanon and on Border," *New York Times*, May 12, 1981.

⁴Short of destroying the missiles, the IAF continued to monitor their activity through overflights by Mastiff and Firebee drones, occasionally drawing Syrian fire. It also conducted low-level supersonic fighter passes over the emplacements in an effort to keep pressure on the Syrians. Both activities provided valuable target data for IAF mission planners. See "Israeli Drones Keep an Electronic Eye on the Arabs," *New York Times*, May 23, 1981, and "Syria Vows to Maintain SAM Sites," *New York Times*, May 31, 1981.

⁵"Mismatch in the Sky," *Newsweek*, June 21, 1982.

The target complex consisted of 19 SA-6 batteries deployed at several locations in the Bek'a Valley, an agricultural plain in central Lebanon some 10 miles wide by 25 miles long and flanked on both sides by ridgelines up to 6500 ft high. Key mission support elements included several E-2C surveillance aircraft orbiting off the coast of Lebanon, a Boeing 707 electronic intelligence (ELINT) platform, and numerous ground and airborne jammers (the latter aboard CH-53 helicopters).⁶ The functions of the E-2C were to provide gap-filler support for Israeli ground radars, monitor the airspace over the target area and beyond into Syria, and provide vectoring and battle-management assistance to Israeli fighters in the event that Syrian MiGs rose to challenge the SAM suppression operation.⁷ The 707, for its part, was poised to monitor Syrian SA-6 radar activity. Finally, Israeli jammers were to be employed against voice and data-link transmissions between Syrian fighters and GCI sites (and perhaps also against other threat emitters such as enemy aircraft and SAM radars).

Reports about the equipment and tactics employed by the IAF vary widely. Most accounts agree, however, that the mission was accomplished by a combination of F-4s with Shrike and Standard ARM missiles, F-16s with standoff weapons and conventional bombs, and a variety of other systems (notably artillery and ground-launched missiles).⁸ The attack reportedly commenced with a wave of remotely piloted vehicles (RPVs) launched as decoys to activate the engagement radars of the SA-6s.⁹ As expected, the Syrians rose to the bait, showed

⁶Drew Middleton, "Soviet Arms Come in Second in Lebanon," *New York Times*, September 19, 1982.

⁷"Washington Roundup: Mideast Air Battle," *Aviation Week and Space Technology*, June 28, 1982.

⁸This reconstruction draws from numerous second-hand journalistic accounts. Among the more interesting reports on IAF tactics employed in the SAM strike are Clarence A. Robinson, Jr., "Surveillance Integration Pivotal in Israeli Successes," *Aviation Week and Space Technology*, July 5, 1982, pp. 16-17, and Russell Warren Howe, "DoD Opt for Untested U.S. Drone," *Washington Times*, September 28, 1982. See also Richard Homan, "Israel Inflicts Heavy Air, Missile Losses on Syria," *Washington Post*, June 10, 1982; Michael Getler, "Superior Weapons, Pilots, Tactics Seen as Key to Israeli Victories," *Washington Post*, June 11, 1982; David B. Ottaway, "Israel Said to Master New Technology to Trick and Destroy Soviet-Made Missiles," *Washington Post*, June 14, 1982; Charles Mohr, "New Wars Show the Powers of Military Basics," *New York Times*, June 18, 1982; and Craig Oliphant, "The Performance of Soviet Weapons in Lebanon," *Radio Liberty Research*, RL 68/83, February 7, 1983.

⁹The story continues to be muddled on this point. Some versions have the IAF using its slow-flying Scout and Mastiff reconnaissance drones in this capacity. Others indicate that the Israelis used Samson and Delilah drones, the former air-launched from F-4s and the latter ground-launched (see Middleton, 1982, *op. cit.*). Syrian SA-6 operators would have been more likely to react to this second set of systems, since they presumably would more closely approximate the speed and radar signature of fighters than the Scout and Mastiff. It is possible, however, that all four types of drones played a part in the

poor target discrimination and firing discipline, and initiated a massed launch of SAMs against the incoming drones. Once positive SAM activity was confirmed by the 707, the following sequence of events (or something like it) unfolded in rapid succession:

- SAM radars in the southern portion of the Beka'a were attacked by artillery from Israeli ground units that had rapidly moved forward from their positions south of the Awwali River, as well as by Israeli *Ze'ev* ("Wolf") ground-launched battlefield missiles.¹⁰
- SAM radars located farther north, outside IDF artillery and missile range, were simultaneously engaged by F-4s using Shrike, Standard ARM, and Maverick.
- Once the Syrian SAM radars had been neutralized by a combination of electronic countermeasures (ECM) and physical destruction, F-4s and F-16s employing low-level ingress and terrain-masking tactics entered in simultaneous attacks from multiple directions, delivering standoff munitions, cluster bomb units (CBUs), and general-purpose bombs against surviving radar vans and the SA-6 missile launchers.¹¹

In the course of this highly orchestrated strike, which reportedly took only 10 minutes, Israeli forces destroyed 17 of the 19 SA-6 sites in the Beka'a Valley, as well as several SA-2 and SA-3 sites.¹² Throughout the operation, orbiting Scout and Mastiff RPVs provided continuous video coverage of events for the ground-based IAF strike commander. The

attack—the first two to induce the Syrians to activate their tracking radars (thus providing IAF antiradiation missiles with emitting targets to guide on) and the other two to add to the confusion factor and perhaps goad the Syrians into firing.

¹⁰Little is known about the *Ze'ev*. Some accounts describe it as a ground-launched antiradiation missile. Others depict it as a long-range artillery shell with terminally homing submunitions. In all events, it appears to have played a prominent role in the operation (though by no means the near-exclusive one attributed to it by Colonel Dubrov). See Robinson, 1982, *op. cit.*, p. 16. See also the interview with IDF Chief of Staff Lt. Gen. Rafael Eitan, "We Learned Both Tactical and Technical Lessons in Lebanon," *Military Electronics/Countermeasures*, February 1983, p. 100. Gen. Eitan confirmed that "heavy aerial bombardment" was employed in the attack but added that "our forces were advancing at such speed that within a short period of time the battery sites were not only under ground-force artillery range but within the range of our family of computer-guided surface-to-surface missiles."

¹¹Paul S. Cutter, "ELTA Plays a Decisive Role in the EOB Scenario," *Military Electronics/Countermeasures*, January 1983, pp. 135-137.

¹²By one account, the IAF additionally destroyed several SAM sites within Syria near the Lebanese border, presumably through standoff attacks. (The Israelis have publicly maintained that their pilots never penetrated Syrian airspace proper.) See Anthony H. Cordesman, "The Sixth Arab-Israeli Conflict: Military Lessons for American Defense Planning," *Armed Forces Journal International*, August 1982, p. 30.

Boeing 707 continued to monitor enemy radar emissions and transmitted threat data to attacking fighters. Chaff and flares were used extensively by all Israeli aircraft operating within the Syrian air defense envelope. Numerous SA-6s were fired during this evolution. None found their target and the IAF accomplished the mission without a single aircraft loss. (Several Israeli fighters, however, are reported to have recovered with moderate to severe battle damage.) The two surviving SA-6 sites, as well as some additional batteries that were replenished with new equipment overnight, were destroyed in a similar IAF raid the following day.

THE AIR BATTLES

As expected, the Syrian Air Force scrambled a large number of MiGs to engage the attacking Israeli fighters. The IAF was fully prepared. Several F-15 and F-16 combat air patrols (CAPs) were positioned west of the Beka'a Valley to intercept any Syrian fighters that might attempt to disrupt the SAM suppression raid. Intelligence on Syrian MiG activity was excellent. By one account, the Israeli Scout RPV used its electro-optical zoom lens and digital data link to provide real-time video imagery of Syrian fighters positioned for takeoff.¹³ The E-2C, with its 200-mile surveillance range, was able to pick up the MiGs on radar as soon as they left their runways and relayed intercept vectors to the IAF fighter CAPs. Once the enemy fighter formations were airborne, their communications were massively jammed and they were deprived of any contact with their GCI controllers. (IAF fighters carry jam-resistant radios and were able to communicate with their own controllers through secure voice and data link despite countervailing Syrian jamming attempts.)¹⁴ The Israelis also used some F-15s in a tactical AWACS mode to provide gap-filler support for the E-2C and to assist other fighters.¹⁵

The resultant confrontation was by far the largest in the history of Middle East air warfare. At its height, there were reportedly some 90 Israeli and 60 Syrian jets simultaneously airborne in the combat arena.¹⁶ The IAF enjoyed the combined advantages of tactical initiative, numerical preponderance, superior aircraft and munitions, and confident knowledge of where the Syrian threat would be concentrated.

¹³Robinson, 1982, *op. cit.*, p. 16.

¹⁴John V. Cignatta, "A U.S. Pilot Looks at the Order of Battle, Beka'a Valley Operations," *Military Electronics/Countermeasures*, February 1983, pp. 107-108.

¹⁵Getler, *op. cit.*

¹⁶Homan, *op. cit.*

Using their look-down radars and all-aspect missiles (both of which the Syrians lacked),¹⁷ Israeli fighters simply picked off any MiGs that ventured past a preestablished line.¹⁸ Although the IAF maintains that it took no shots at Syrian fighters from beyond visual range, it evidently made extensive use of blind-side tactics by employing the E-2C to vector F-15s and F-16s into beam attacks against Syrian MiGs (where their radar warning systems were reportedly least effective).¹⁹

Beyond Israel's advantages in equipment and tactics, another notable feature of the engagement was a marked asymmetry in pilot skill. Upon having their communications jammed, the Syrians lost any semblance of air discipline and quickly became split up into isolated pairs and singles. As one Western military attaché who witnessed part of the air battle from the ground later recounted, "I watched a group of Syrian fighter planes fly figure-eights. They just flew around and around and obviously had no idea what to do next."²⁰ This impression was confirmed by the after-action comments of an anonymous senior IAF officer: "The problem was that [Syrian] pilots didn't do things at the right time or in the right place. They flew in a way very difficult to understand. . . . The pilots behaved as if they knew they were going to be shot down and waited to see when it was going to happen and not how to prevent it or how to shoot us down." Reflecting on this lack of aggressiveness and initiative (and apparent unfamiliarity with air combat) displayed by the Syrians, he added: "They could have flown the best fighter in the world, but if they flew it the way they were flying, we would have shot them down in exactly the same way. It wasn't the equipment at fault, but their tactics."²¹

The IAF downed 23 Syrian fighters during this engagement while sustaining no losses of its own. The following day, Israeli fighters shot down 15 more MiGs. By the end of July, the IAF had destroyed 85 Syrian aircraft (half MiG-21s and half MiG-23s) in a cumulative series of air battles without losing a single aircraft to enemy fighter action. According to press accounts of remarks by General Wilbur Creech, Commander of the USAF Tactical Air Command, about 40 Syrian

¹⁷George C. Wilson, "Israel Proves U.S. Arms Effective, General Says," *Washington Post*, June 17, 1982.

¹⁸In Gen. Eitan's words, the Syrian MiG pilots "were very irrational in their attack on our Air Force, literally bashing their heads against a wall. Anyone who crossed an imaginary line in the direction of our forces was destroyed. . . . The imaginary line was actually the range of the emplaced missile batteries in Syria proper." Interview in *Military Electronics/Countermeasures*, February 1983, p. 101.

¹⁹Cignatta, *op. cit.*

²⁰Quoted in Vincent J. Schodolski, "Soviet Arms Replacing Syrian War Losses," *Chicago Tribune*, March 23, 1983.

²¹"Beka'a Valley Combat," *Flight International*, October 16, 1982, p. 1109.

fighters were downed by F-15s, some 44 by F-16s, and one by an F-4. Most of these kills were accomplished by the AIM-9L. By this same account, only seven percent of the Syrian MiG losses resulted from gun kills.²² This suggests that despite some initial impressions, what actually occurred was not a single, swirling, multiparticipant "dogfight" in the classic sense, but rather a series of independent encounters between smaller numbers of fighters on both sides, with the Israeli pilots maintaining their speed, keeping predictable maneuvers to a minimum, and capitalizing on their all-aspect weapons by taking snap shots of opportunity. Whatever the case, the result was a complete rout that established a new high for IAF kill ratios in air combat.

OVERVIEW

Israel's air operations over Lebanon in 1982 constituted the first full-scale test of current-generation American tactical air weaponry. Their distinctive features included combined-arms employment in a real-time electronic warfare environment and thorough integration of high-technology hardware with exceptional training, tactics, and leadership competence. It would be risky to generalize overarching "lessons" from this experience (and the Israelis themselves have expressly cautioned against trying) because of several circumstances that rendered the Lebanese air war unique.²³ For one thing, the operation was severely limited in scope, intensity, objectives, and number of participants. Second, the Syrian SAM threat consisted largely of fixed SA-6s whose positions were well known by the IAF. This posed considerably less of a challenge than the USAF would face against integrated Soviet air defenses in Central Europe (or the IAF itself would confront in a major air war over the Golan Heights).²⁴ Finally,

²²"Foxhound Gives Soviets First Look, First Fire Against F-15," *Aerospace Daily*, August 5, 1982, pp. 193-194. See also "U.S. Arms Used in Lebanon War Outstrip Soviets," *Wall Street Journal*, August 5, 1982.

²³The IAF commander at the time, Maj. Gen. David Ivry, declined to participate in press interviews after the Beka'a Valley offensive because of his concern, as reported by a respected Israeli defense journalist, that his remarks might inadvertently be used to feed unwarranted Israeli "self-aggrandizement . . . spilling over into euphoria." Ze'ev Schiff, "The Danger of Mistaken Conclusions," *Ha'aretz* (Tel Aviv), August 27, 1983. Note also the following comment by an anonymous IAF officer: "We should be very careful in drawing lessons from this very limited, restricted war. . . . We flew within a space of 15-30 miles, we didn't cross the Syrian border. We didn't attack their military bases or other strategic targets." "Beka'a Valley Combat," *op. cit.*

²⁴Remarks by Maj. Gen. Perry M. Smith, USAF, cited in "Menachem Begin's America," *Foreign Report*, September 23, 1982.

the IAF commanded unprecedented numerical superiority over the enemy and maintained the tactical initiative at all times. Neither circumstance would be likely to favor Israel in a full-fledged war against a coalition of Syria, Jordan, and Iraq. They certainly could not be expected to favor the United States and NATO in a conventional war in Europe initiated by the Warsaw Pact.

Nevertheless, the IAF performed very well in this campaign by any measure—so well, in fact, that its leaders were reportedly astonished to have come through it virtually unscathed.²⁵ By the end of September, it had amassed a total score of some 29 SAM sites destroyed in seven raids and 85 Syrian MiGs downed—with only two Israeli aircraft losses to enemy ground fire.²⁶ These numbers are, of course, only approximations from a variety of conflicting accounts, and the IDF has remained silent on most of the operational matters addressed above.²⁷ Despite continued uncertainty at the margins, however, there is no denying the impressiveness of the IAF's performance in the aggregate. It dealt a serious setback to Syria, deeply embarrassed the Syrian High Command's Soviet suppliers, and provoked intense Soviet discomfiture over the dismal showing of its front-line weaponry in the eyes of an interested and watchful world.

²⁵Robinson, 1982, *op. cit.*

²⁶For a well-researched summary of Israeli combat accomplishments during this period, see Cynthia A. Roberts, "Soviet Arms Transfer Policy and the Decision to Upgrade Syrian Air Defenses," *Survival*, July-August 1983 pp. 154-164.

²⁷The former Chief of Staff, Lt. Gen. Eitan, has confirmed at least some of the key points on Israeli weapons and tactics employed. These include employment of RPVs for real-time target surveillance and the use of a 20-km range missile (presumably the Ze'ev), described as a cluster bomb with "1200 separate explosive units, which proved devastating to the enemy, especially against radar emplacements and field artillery." "We Learned Both Tactical and Technical Lessons in Lebanon," *op. cit.*, p. 96.

III. EARLY SOVIET REACTIONS TO IAF COMBAT SUCCESSES

It is scarcely surprising that the Soviets should have been so distressed by these events. Apart from the widespread humiliation they caused the Soviet leadership, they raised troublesome questions about possible shortcomings in Soviet combat equipment—with implications reaching well beyond Moscow's narrow interests and stature in the Middle East. The SA-6, after all, is a system on which the Soviets themselves depend heavily for theater air defense in Europe and elsewhere. Likewise, though they lacked the latest-generation Soviet weapons and fire-control systems (the APEX missile and HIGHLARK radar), the Syrian MiG-23s that were so totally outclassed by the IAF are virtual carbon copies of the Soviet Union's best air superiority fighter in current service. They also represent one of the mainstays of the Soviet Union's military aid relationship with many third-world client states. Not long after the Beka'a Valley campaign, Iraq and Peru were among the first of those states reported to have questioned the adequacy of their Soviet weapons as a result of the Syrian debacle.¹ This was only the harbinger of a broader setback sustained by the traditional image of Soviet prowess that had hitherto undergirded Moscow's far-flung international arms trade.

In the immediate wake of the Lebanese war, the U.S. government pressed Israel hard to share the details of its combat experiences so that the USAF, in particular, might benefit from learning how its previously untested equipment had performed.² The Soviets, for quite different reasons, had even more urgent interests in deriving appropriate "lessons" and lost no time dispatching a sizable data collection team to Damascus to gain first-hand answers about why their weaponry took such a drubbing. As a measure of its agitation, Moscow began resupplying Syria with attrition-fillers only a day after the Beka'a Valley dust had settled—well before the Soviets had more than the broadest inkling of what had happened beyond the obvious facts of Syria's

¹Ernest Conine, "Red Faces in the Kremlin: Soviet Arms Failures in Lebanon Could Lead to Danger," *Los Angeles Times*, October 4, 1982.

²After much Israeli resistance, this finally occurred in the spring of 1983. See Bernard Gwertzman, "Israelis to Share Lessons of War with Pentagon," *New York Times*, March 22, 1983.

extensive combat losses.³ Following that, the first of four Soviet delegation visits occurred on June 13 under the leadership of Colonel General Yevgenii Yurasov, first deputy commander of the Soviet Air Defense Forces.⁴ This visit was only cursorily noted by the Soviet media and was portrayed as a routine "friendship" meeting to reaffirm Moscow's security commitment to Syria. Although much of the delegation's time was undoubtedly spent negotiating follow-up arms transfers and security arrangements, its main concern was almost surely a searching review of every aspect of Syrian combat performance so that appropriate countermeasures might be introduced into front-line Soviet forces. Concern about possible problems with Soviet weaponry implied by the one sided outcome was evidently such that the Chief of the Soviet General Staff, Marshal Ogarkov, reportedly paid a visit to Damascus in July to conduct a personal evaluation.⁵

To save face and shore up its political footing in the region, the Soviet Union commenced a major rearmament of Syria in the wake of these consultative meetings. In addition to replacing the MiGs and SAMs that had been destroyed, the Soviets provided Syria with several new weapons types, including the SA-8, SA-9, and most important, SA-5.⁶ The latter weapon, never before deployed outside the Soviet Union, has a slant range of 180 n mi and is capable of engaging Israeli aircraft flying within Israeli airspace and off the Lebanese coast. It thus confronts Israel with a new deterrent challenge. It would have to be destroyed preemptively in any future IAF air operation against Syria that envisaged employment of E-2C and 707 aircraft. Yet it is

³Roberts, *op. cit.*, p. 156. See also James F. Clarity, "Moscow Replacing Syrians' Materiel," *New York Times*, October 4, 1982.

⁴William Branigin, "Soviet Gen. ... Said to Assess Syrian Losses," *Washington Post*, June 15, 1982; John F. Burns, "... Stresses Worry over Military Actions Close to Its Border," *New York Times*, June 15, 1982.

⁵Drew Middleton, "Mideast War: Things Soviets Learned in '82," *New York Times*, January 2, 1983.

⁶Thomas L. Friedman, "Syrian Army Said to Be Stronger Than Ever, Thanks to Soviets," *New York Times*, March 21, 1983, and "Syria and Russia: For Russians Only," *The Economist*, May 7, 1983. For detailed discussion, see Roberts, *op. cit.* An Israeli F-4 was downed by one of the SA-8s introduced into the Bek'a Valley in August 1982, during a raid sent out to eliminate the new Syrian missile units ("Soviets Order SA-8s into Action in Bek'a after Israeli Successes," *Aviation Week and Space Technology*, August 9, 1982). Another F-4 was promptly dispatched to destroy the wreckage of the downed aircraft to prevent its ECM equipment from falling into Soviet hands. Unconfirmed reports later indicated that between 11 and 200 Soviet technicians who had been combing the wreckage were killed in the Israeli attack (see Frank Greve, "U.S. Air Strikes Against Syria Could Hit Soviet Advisors," *Philadelphia Inquirer*, December 7, 1983, and "200 Soviets Died in Israeli Raid, Magazine Says," *Philadelphia Enquirer*, December 14, 1983). Needless to say, none of this was mentioned by the Soviet domestic media or acknowledged by Soviet foreign propaganda.

exclusively manned by Soviet personnel, whose presence would almost certainly constitute a powerful restraining factor in Israeli planning.⁷ Other developments heralding a deepened Soviet involvement included the dispatch of some 2000 additional Soviet advisers to the Syrian armed forces, expansion of a Soviet submarine facility at the Syrian port of Tartus, deployment of SS-21 tactical ballistic missiles to Syria, and commencement of heavy ECM activities using helicopter jammers and other countermeasures to complicate future IAF raids.

None of this could disguise the fact that for all their surface appearance of "solidarity" with the Syrians, the Soviets were severely stung by the visible setback sustained by their hapless Middle Eastern client. On the diplomatic circuit, there were widespread private expressions of Soviet disgust over Syria's ineptitude in squandering away what, in more competent hands, should have been perfectly adequate weaponry.⁸ Soviet commentators also took the unusual step of publicly refuting Western claims that American weapons employed by Israel were "superior" to those provided to Syria by the USSR. To help counter internal and foreign tendencies to doubt the technical virtuosity of Soviet weaponry, the Soviet domestic media and TASS immediately proclaimed that "in a bid to diminish the potentialities of the forces opposing the Israeli-American aggression in Lebanon," U.S. and Israeli propaganda agencies were "intensively circulating deliberately false information about Soviet combat equipment." In this vein, a TASS commentary on July 1 petulantly complained that the "combat qualities of American arms used by the Israelis are being extolled in every way, while the losses sustained by the interventionists on Lebanese soil are understated." Although it conceded substantial losses to the Syrian side in the conflict, the TASS statement sought to dismiss this as an inevitable consequence of the IDF's "sudden and massive blow on Lebanon by all its armed services."⁹

This argument was repeated two days later by the head of the CPSU Central Committee's International Information Department, Leonid Zamyatin. He too acknowledged that Syria's losses were "higher" than

⁷"Israelis Reporting a Soviet Buildup," *New York Times*, April 29, 1983. According to this account, both SA-5 sites are off limits to Syrians and have direct communications links to Moscow. For further discussion, see also R. W. Apple, Jr., "Soviet Puts New Missiles in Place at Russian Bases in Western Syria," *New York Times*, May 16, 1983.

⁸"Russia and the Arabs: Where Were You?" *The Economist*, July 3, 1982, p. 29. See also Galia Golan, "The Soviet Union and the Israeli Action in Lebanon," *International Affairs* (London), Winter 1982-1983, p. 8.

⁹Serge Schumann, "Moscow Defends Quality of Arms It Sells to Arabs," *New York Times*, July 2, 1982. See also A. Vlasov, "Strategic Allies' Aggression," *Izvestiia*, June 20, 1982, for an earlier Soviet reaction to the poor showing of Soviet weaponry during the Bekaa Valley bouts.

those suffered by Israel, but insisted that this was attributable "not to the weapons supplied by the USSR but to well-known military advantages traditionally enjoyed by the attacking side." He added, however, that Israeli was deliberately "minimizing" its own losses and that in fact "up to 40" of its aircraft had been shot down during the preceding month's fighting. As for the conflict itself, Zamyatin said it was initially assumed that the Israelis would not engage Syrian forces during their sweep toward Beirut, but allowed that on June 9 "a real battle" took place between the two countries. A subsequent TASS statement sought to downplay this by conceding Israel only a "limited military success" against "a rather limited antiaircraft defense force of Syria in Lebanon." It rationalized Syrian air losses by asserting that the Syrians "did not have a ramified network of radar stations [which] complicated their action." It further tried to cast Syrian conduct in a favorable light by noting that "Israeli planes did not violate the airspace of Syria a single time," attributing this to the IAF's sober recollection of its "heavy losses" suffered at the hands of Syrian air defenses during the 1973 war.¹⁰

All in all, the thrust of Soviet domestic commentary on the Lebanese conflict was to convey an impression entirely at odds with the facts. For example, following the IAF's destruction of Syria's SAM sites, Radio Moscow spoke of "serious battles . . . in the Bekaa Valley, where Syrian forces have been repulsing attacks by the Israeli aggressors in three directions."¹¹ A month later, a *Red Star* article went significantly further in misrepresenting the truth when it claimed that "Syrian troops, using Soviet-made weapons and materiel, have inflicted considerable losses on the Israeli forces. . . . Several [Israeli] air defense missile batteries have been destroyed," it falsely reported, "and 67 Israeli aircraft, including modern U.S.-made F-15 and F-16 fighters, were downed."¹² Echoing this distortion, a TASS dispatch cited Western statements extolling the "extensive capabilities of the . . . F-15 and F-16 . . . and the 'success' of these aircraft in putting out a number of Syrian air defense missile units" and summarily discounted these as products of an Israeli "propaganda stratagem." Instead, it maintained, "Israeli pilots have learned at first hand the high skills of Syrian pilots and have seen for themselves that . . . the Syrian air defense forces have shot down a number of enemy planes, including F-15 and F-16 fighter-bombers." "Facts show," it concluded, "that the

¹⁰Quoted in Dusko Doder, "Moscow Denies that Israelis Proved Superiority of U.S. Weapons," *Washington Post*, July 4, 1982.

¹¹Radio Moscow domestic service, June 11, 1982.

¹²*Krasnaia zvezda*, July 18, 1982.

Syrian Army possesses modern weapons [and] has shown its capability to repel the aggression."¹³

The ultimate in Soviet fabrication, however, was a succession of articles by Colonel G. Kashuba (billed as a "special correspondent" to *Red Star*), whose contrivances in seeking to glorify Syrian combat performance went to such extremes as to be downright entertaining to any reader aware of the facts or inclined toward skepticism over the Soviet propaganda line.¹⁴ In one of his more fanciful flights of imagination, Colonel Kashuba described his visit to a Syrian air base and his recollection of fighter operations that he observed in the wake of the Bek'a Valley engagements:

An aircraft came in to land. I looked at its streamlined, beautiful contours. I recognized a MiG. . . .

The aircraft taxied into the standing area. Its turbines were steaming with heat. . . . A thickset figure encased in a G-suit, with lively expressive eyes and curling, oily hair over a high forehead, jumped out of the cockpit. If you were to draw his portrait, you would have a generalized image of a Syrian airman.

We introduced ourselves. He was Captain Nafi Salmu. He was just 25 years old but already a section commander with about 700 hours of flying time. . . .

I asked Nafi to describe the battle in which he downed an Israeli F-15. The officer began speaking animatedly, gesturing to represent his plane's maneuvers. The interpreter couldn't keep up with him and

¹³TASS communiqué (in English), July 20, 1982. As a measure of the depth of Soviet sensitivity on this score, the same argument was replayed a year and a half later in the Soviet military's English-language magazine intended for foreign consumption. After debunking Israel's "fantasies" concerning the performance of its American equipment against Soviet products flown by the Syrian Air Force, the article proceeded to accent the technical virtues of the MiG series, even going so far as to claim that the United States "scrupulously copied the MiG-21's best features in designing the F-15 fighter." Lest the message that mattered be forgotten, however, it also concluded that "to fully use these capabilities, those who exploit and maintain this equipment must possess comprehensive and deep knowledge. The aircraft may be a formidable and reliable weapon only in the hands of well-trained pilots" (emphasis added). Colonel N. Yelshin, "Simple and Reliable MiGs," *Soviet Military Review*, No. 1, January 1984, pp. 26-28.

¹⁴"Airborne Fighters on the Alert: Dispatch from Unit X of the Syrian Air Force," *Krasnaya zvezda*, August 28, 1982; "In the Bek'a Valley," *Krasnaya zvezda*, August 31, 1982; and "First-Time Hit," *Krasnaya zvezda*, September 30, 1982. The last of these articles recapitulates a Syrian newspaper report entitled "Our Weapons Are Good and Our Fighters Are Capable of Using Them with the Utmost Efficiency." In it, Colonel Kashuba notes that Syria's "Soviet antiaircraft missiles . . . proved their effectiveness whenever used . . . [and] showed once again that Israeli pilots are by no means as 'invincible' as Zionist propaganda makes out."

had difficulty translating the aviation terminology. Then Captain Salmu took my notebook and with a few clear strokes drew the picture of his duel with the F-15. The victory had not been easy, the enemy had been subtle.¹⁵

This nonsense neatly summarizes the general propaganda view of the Bek'a Valley operation developed and circulated by the Soviets for domestic consumption. Astute Soviet pilots, especially those with personal experience at dealing with the Syrians, most likely had little difficulty seeing through Kashuba's tale and others like it.¹⁶ All the same, the foregoing examples typify the way in which the Lebanese air war was interpreted for the homefront by the Soviet media throughout the year and a half before the appearance of Colonel Dubrov's analysis.

¹⁵Kashuba, August 28, 1982, *op. cit.*

¹⁶Indeed, it would not be surprising if the Soviet armed forces were rife with private jokes about Syria's pathetic conduct during the Bek'a Valley campaign. Following Israel's victory in the October 1973 war, it was common to hear sarcastic remarks attributed to the Soviets about a new Egyptian tank requirement for back-up lights and how the Egyptian Defense Minister had lamented during a postmortem in the Kremlin that he had studiously followed all the lessons of Soviet military doctrine from World War II . . . and was still waiting for the "long Russian winter" to set in over Suez. After the Lebanon war, similar stories began to circulate about how the Syrian Air Force maintained a Departure Control but no Approach Control and how a Syrian general, upon being told by his Soviet patrons that he already had the best Soviet surface-to-air missiles, replied that what he really needed was some good surface-to-aircraft missiles!

IV. INSIGHTS AND OVERSIGHTS IN THE DUBROV ARTICLE

In sharp contrast to the Soviet commentary noted above, Dubrov's remarks are entirely professional in tone and purpose. They are not aimed at foreign audiences or the Soviet population at large, but at officers with special interests in tactical air weapons and operations. Aside from some perfunctory propaganda boilerplate at the beginning and end, the article is devoid of ideological axe-grinding and sticks closely to describing and analyzing technical matters. As such, it should be read as a serious effort by the Soviet Air Force to communicate a credible account of the Lebanese air war to its aircrews.

Dubrov addresses equipment and tactics (both air-to-air and air-to-ground) in equal measure. An interesting question concerns the nature of his source materials. Undoubtedly the Soviets have done extensive classified analyses based on their debriefings of the Syrians, but these would not routinely be shared with Soviet aircrews or alluded to in a general-circulation article of this sort.¹ Indeed, given the exceptional secrecy and compartmentation that limit information flow within the Soviet military, it is a fair question whether Dubrov himself was ever directly exposed to them. As noted earlier, Dubrov frequently references "foreign experts" and the "foreign press," and his account of the various hardware items used by the IAF probably does derive from those sources. But he also discusses matters of an operational nature—formations and spreads, ingress techniques, engagement tactics, weapons-release parameters, and the like—which have not been treated openly in Western publications. Insofar as they ring true, they may derive from Syrian accounts or from direct Soviet observation. In cases where they appear to run counter to reasonable inferences about how the IAF most likely employed its forces, they may be entirely fabricated. In all events, they are hard to corroborate in the absence of independent Israeli testimony.

The Dubrov article is far more instructive for what it ignores than for what it includes. For example, the reader is treated to lengthy commentary on F-15 and F-16 performance characteristics, fighter patrol techniques, the use of airborne radar surveillance and battle-

¹Responding to a question on a related matter back in the mid-1970s, a former Soviet pilot told me that he had heard through the grapevine about a study having been done on air combat events during the Vietnam War, but that any such study would have been far too highly classified to be shared with the likes of him and his contemporaries.

management platforms, and how operations among these various assets were coordinated. Yet he is not given the slightest clue that the net result of this activity was a sustained turkey shoot in which the Syrians lost 85 aircraft in the course of three months. For all its detail in describing the set-up, the article remains virtually silent on the combat itself.

Dubrov also alludes to defense suppression but offers nothing approximating a recognizable description of what actually happened to Syria's SA-6s in the Beka'a Valley. Indeed, he expressly *denies* that SAMs figured as Israeli targets and leaves his readers to believe that the IAF performed as well as it did because its operations "were carried out over a country that did not have modern antiaircraft systems" but only "antiaircraft artillery units . . . organic to combined Arab forces located on Lebanese soil." The effect is like reading a variation on *Hamlet* without any reference to the prince. Perhaps these distortions are only to be expected, given the Soviet Union's natural incapacity to concede the unpleasant truth. All the same, they indicate that for all the earmarks of dispassionate professionalism conveyed by the article, Dubrov is clearly striving to sweep the more disturbing aspects of the story under the rug.

LESSONS LEARNED

Among the genuine operational implications (or at least topics for serious thought) the Soviets may have extracted from the Lebanon war, the following points touched upon by Dubrov may be suggestive:

The increased freedom of maneuver afforded by using air-superiority fighters in separate patrol orbits rather than in direct support of strike formations. Dubrov correctly notes that detaching counterair elements from direct escort and allowing them to roam their assigned CAP sectors freely not only enhances their defensive utility but also their offensive leverage against enemy air threats. However, he erroneously describes this as merely a "minimal" departure from U.S. fighter tactics developed during the Vietnam War. He also goes overboard in depicting as a "negative feature" of offensive CAPs what he claims to be their dependence on "positive radar control outside the strike zone." At several points, Dubrov describes the E-2C (or a comparable surveillance platform) as a necessary prerequisite for such employment. In doing so, he overlooks the considerable autonomous search capability possessed by the F-15's onboard radar. Moreover, his assertion that Israeli use of fighter sweeps revealed "diminished reliability . . . in comparison to direct accompaniment of bombers" has a defensive tone

suggesting that the Soviets may remain wedded to direct escort of strike formations in their own operational doctrine.

Nevertheless, Dubrov's special fascination with F-15 employment could indicate serious tactical ferment within the Soviet fighter community. For years, going as far back as World War II, the Soviet Air Force has resisted the idea of allowing its pilots much independence and has instead stressed the importance of maintaining close control over its fighters at all times.² Recently, however, it has begun to acquire equipment that would allow it, in principle, to go well beyond that restrictive operating doctrine. With the advent of the new MiG-29 and SU-27 fighters that will soon be entering operational service, Frontal Aviation will have aircraft with substantially improved weapons, avionics, and maneuvering performance.³ It will not, however, be able to extract anywhere near the full potential afforded by that capability if it continues to operate in accordance with its traditional air combat doctrine. Although it remains far too early to tell (and although powerful stylistic proclivities will have to be overcome before any significant change can occur), the interest in Israel's F-15 operations reflected in Dubrov's commentary may suggest that Soviet Air Force leaders may have this problem increasingly in mind. In all events, it involves an area that will continue to bear careful watching.

The vulnerability of airborne surveillance platforms to enemy fighter and SAM action. However mistaken Dubrov may be in implying that fighter CAPs are "dependent" on AWACS support, there is no question that AWACS platforms are substantial force multipliers and thus constitute lucrative targets. Dubrov notes that the IAF felt obliged to station its E-2Cs well beyond Syrian SAM range and further took heed to guard them against the Syrian MiG threat with a pair of F-15s. He also suggests that without E-2C support, the IAF would have been unable to achieve its air combat results. This may say something about the Soviet rationale for subsequently providing Syria with the SA-5, whose extended range will allow it to engage targets like the

²According to a writer with extensive recent exposure to the USAFE community, "Soviet doctrine requires that most missions be flown under positive ground control, with the added provision that if contact with the ground controller is lost, the mission is to be aborted." He also notes that "the USAF spends much more time and money educating fighter pilots than the Russians do" and that the "highly realistic training regimen introduced to American pilots after the Vietnam War has no equal in the East." Michael Skinner, *USAFE: A Primer of Modern Air Combat in Europe* (Novato, Calif.: Preadio Press, 1983), p. 122.

³Both aircraft are reportedly optimized for air-to-air combat and feature exceptional acceleration and agility, medium-range missiles with active terminal guidance, and pulse Doppler fire-control systems with extended-range, track-while-scan radars. See Clarence A. Robinson, Jr., "Soviets Deploying New Fighters," *Aviation Week and Space Technology*, November 28, 1983, pp. 18-20.

E-2C and 707 even in overwater orbits or deep within Israeli airspace. It may also telegraph Soviet thinking about the need to neutralize the USAF E-3A as an early priority in the event of a European war. Insofar as this impression is correct, it suggests a derivative "lesson" for USAF and NATO planners as well.

The value of communications and radar jamming. Although Dubrov mentions this only in passing, there is little doubt that the combat utility of ECM was forcefully reconfirmed to the Soviets by the Lebanon experience. Syrian MiG formations were heavily jammed by the Israelis from the moment they were airborne. As a result, Syrian pilots were unable to receive either intercept directives or evasive commands from their controllers and were thus deprived of any offensive or defensive potential. The Soviet Air Force currently operates under a similar close-control doctrine and would be comparably vulnerable to enemy jamming interference. How (or whether) the Soviets will eventually change their modus operandi in response to this threat is a question that cannot be explored here. But the strong implication for any intelligent Soviet planner surely must be an appreciation of the growing need either for electronic counter-countermeasure (ECCM) capabilities that would permit Soviet pilots to talk through enemy jamming measures or else new departures in training and tactics that might reduce this direct dependence on GCI support.

The utility of employing fighters with long-range radars in a mini-AWACS role. Dubrov notes the IAF's use of the F-15 in lending gap-filler support to the E-2C and in transmitting airborne target data to F-16s (which lacked the radar capability of the F-15). He further acknowledges that "this was the first time such interaction between fighters has ever been practiced." Insofar as the SU-27 is expected to have a similar capability, this reference may suggest underlying Soviet efforts to unburden themselves from their current dependence on ground-based management of the air battle by extracting greater force-multiplier potential from their emerging fighter technologies.

The diminished reliability of positive radar control as the depth of air operations into enemy territory increases. Given the close geographic confines of the Lebanese conflict, this was probably less critical a factor in the operations of either side than Dubrov suggests. But his statement that "radar control over fighters weakens with increasing depth into enemy territory" and thus increases "the probability of sudden attack"—especially by enemy aircraft with front-aspect missiles—is correct and has clear implications for Soviet operations planning against NATO. His observation that "air superiority is fundamentally achieved by shifting the battle to the enemy rather than over one's own territory" (since the latter "means losing the initiative") likewise has a

bearing on Soviet tactical air planning for the European theater. Both points suggest Soviet recognition of the growing importance of having the capability and option to use fighters beyond the effective range of Soviet ground-based control facilities.

The value of other "force-multiplier" technologies. Dubrov seems notably impressed by Israeli use of such systems as reconnaissance RPVs, standoff munitions, and even simple things like chaff and flares. The tone of curiosity that accompanies his discussion of these techniques suggests that they may not be routinely practiced in the Soviet Air Force. He seems especially attracted to the cost-effectiveness of RPVs as contrasted to manned aircraft and notes that their ability to provide commanders with real-time target data has become "a most important factor in airpower application." (Although one can only speculate here, this observation could point toward one way the Soviets might seek to solve their problem of locating and engaging NATO's mobile Pershing 2 and ground-launched cruise missiles in the coming decade.) Dubrov also speaks approvingly of precision standoff weapons in attacking high-priority targets where enemy defenses prohibit armed reconnaissance and multiple passes per target. His remark that "free-hunt" operations are impossible in areas where enemy defenses have not been suppressed has relevance to Europe and is consistent with the common Western assumption that any Soviet air campaign against NATO would begin with an attempt to clear penetration corridors through the Hawk belt and other NATO defenses.⁴

LESSONS MISLEARNED OR IGNORED

These and other insights reflected in Dubrov's article are, on balance, overshadowed by its numerous misrepresentations and errors of fact. The first temptation is to dismiss those cases where Dubrov fails to put the point right as undifferentiated examples of intentional disinformation. Some of them, however, may be merely a natural result of the author's looking at novel events through the subjective filter of Soviet military culture and style. Others, particularly those that appear to deny the real significance of the IAF's accomplishments, may reflect a determination to suppress bad news or an ingrained inability to face up to real challenges. USAF readers with authoritative knowledge about what happened over Lebanon will undoubtedly discover numerous holes and faulty interpretations in Dubrov's account. The discussion that follows below will limit itself to the more obvious problems.

⁴See Phillip A. Peterson and John G. Hines, "The Conventional Offensive in Soviet Theater Strategy," *Orbis*, Fall 1983, p. 708.

To begin with, Dubrov unduly discredits the IAF's tactical innovations when he equates them with the so-called "American model" employed a decade ago in Vietnam. Perhaps he is trying to assure his readers that changes in the Western air threat have not rendered matters tougher for the Soviet Air Force in the years since. But by comparing Israeli air operations over Lebanon with the stereotyped and often predictable mission profiles flown by the U.S. Air Force and Navy against North Vietnam,⁵ Dubrov not only misrepresents reality but contradicts his previous remarks about the significance of Lebanon as the first "proving ground" for current-generation fighter aircraft and weapons. Any discerning reader, Western or Soviet, will readily see through the inconsistencies.

Another distortion, already touched upon in the preceding section, is Dubrov's apparent belief that independent fighter sweeps require the direct support of airborne control platforms. To some extent, this may simply reflect insufficient appreciation of the independent-search capability of the F-15's radar (particularly for situations like that in Lebanon, where the focus of enemy fighter concentration and likely axes of attack were precisely known beforehand). More interestingly, however, it may also reflect unwitting Soviet misperception of events resulting from the insidious interference of Soviet military culture bias. Given the Soviet Air Force's long-standing reliance on GCI close control, it could have a natural tendency to look at other variants of battle management in that idiosyncratic light. In the original Russian, Dubrov describes the IAF's E-2C as a "VKP" (*vozdushnyi kommandnyi punkt*, or "airborne command post"). He further claims that Israeli F-15 pilots were obliged to follow "directives" from the E-2C and that F-15 fighter sweep operations were "dependent" on those directives. In doing so, he may be misconstruing the E-2C as merely a variant of the ground-based "KP" (*kommandnyi punkt*) that routinely governs Soviet fighter operations. In other words, he may perceive it as an airborne GCI site fashioned according to Soviet lines, rather than as a largely advisory—as opposed to directive—facility.⁶ This would certainly

⁵A notable exception was Operation Bolo, an offensive MiG sweep into the Hanoi-Haiphong area led by Col. Robin Olds in January 1967. This successful ruse involved a large number of F-4s using the formations, frequencies, and call signs of a typical F-105 strike package to lure the enemy into battle. It was of a piece with the creative imagination that has routinely accounted for the IAF's tactical superiority in air warfare. For details, see *Air War—Vietnam* (New York: Bobbs-Merrill, 1978), pp. 241-247, and Mike Spick, *Fighter Pilot Tactics: The Techniques of Daylight Air Combat* (New York: Stein and Day, 1983), pp. 151-152.

⁶It is common to hear assertions in the West that the Soviet fighter force is "heavily dependent on GCI." This formulation is correct as far as it goes, but it confuses more than it describes. Soviet Air Force literature on operational training makes it quite clear that the function of the command post ("KP") includes not only GCI vectoring but

account for the remainder of Dubrov's faulty inferences regarding the problems that he maintains would plague offensive fighter operations in the absence of AWACS-type support.

If this analysis of Dubrov's reasoning is right, it may militate *against* the likelihood that the Soviets are gradually beginning to move away from GCI close control toward more autonomous fighter operations.⁷ It may also suggest that if and when the Soviets ever deploy their IL-76 AWACS in a theater support role, they will be more inclined to use it as an airborne GCI site rather than in the way the USAF now employs the E-3A. This will afford greater offensive "reach" for Soviet fighter operations over NATO territory, but it will also mean continued suppression of individual pilot initiative and continued emphasis on key tactical decisions being made by higher-level commanders.⁸

Finally, and perhaps most important, Dubrov seems to have missed the boat fundamentally in his treatment of the implications posed by the advent of all-aspect air-to-air missiles. Taking issue with Western claims that the forward-hemisphere attack "has asserted itself as a new element in air combat tactics," Dubrov insists that such missile employment depends on "various complicating factors" and remains, at best, only the "wave of the future." His argument (which considers only the AIM-7F and ignores the AIM-9L) rests on these premises:

- That effective positioning for such an attack requires AWACS vectoring and control, which may or may not always be available;
- That the target aircraft can defeat the attack by maneuvering violently, thus forcing the AIM-7F's seeker head to break lock;
- That the attacking aircraft must "acquire target data before this information is received by the other side."

Dubrov adds that forward-hemisphere attacks by IAF fighters "without transitioning to the maneuvering phase" were only "episodes heralding the future [and] were not typical fighter tactics." His bottom-line "lesson" from this experience for Soviet pilots sounds more like a counsel

overall mission management as well. In other words, the *rukovoditel' poletov* (or "supervisor of flying") who sits in the command post does much of the thinking and decision-making that would routinely take place in the cockpit in USAF and Navy tactical air practice.

⁷For a contrary view, see Capt. Rana J. Pennington, USAF, "Closing the Tactics Gap," *Air Force Magazine*, March 1984, pp. 83-88.

⁸In the words of former USAF Chief of Staff, Gen. Lew Allen, "the Soviets are fairly predictable, doctrinaire, very determined in their approach to things, very strong in a hierarchical sense of how to do things, with less initiative given to people. . . . One of the advantages we seek to exploit is that they're a fairly predictable force." Interview in *Armed Forces Journal International*, February 1979, p. 28.

for complacency than a call for alarm, in light of its curious suggestion that the more things have changed, the more they have remained the same:

The practical side of this conclusion derives from an established fact: Aircraft and weapons are ready to carry out maneuvering combat. What is left is the preparation of the pilot. All the basic propositions of group maneuvering combat theory and practice formulated during World War II are well known. Each subsequent generation of fighter aircraft has added to and perfected these propositions. But the main idea remains unchanged. Looking for some "new in principle" way of training, in the view of experts, is a waste of time.

What are we to make of this perplexing conclusion? Perhaps part of the answer can be attributed to doctrinal lag. Since the Soviet Air Force, by all accounts, still lacks a good all-aspect missile of its own, it necessarily also lacks first-hand training experience in the all-aspect arena and remains caught up in planning for aerial combat aimed at maneuvering toward a classic stern conversion. But this explanation is ultimately unsatisfactory, since we know that the Soviets have for years been seeking to develop missiles with expanded firing envelopes and have spoken openly since the mid-1970s about the tactical advantages that would be afforded by a capability to take forward-aspect shots at the enemy from beyond visual range.⁹ Another interpretation may be that the Soviets remain excessively fixated on extended beyond visual range (BVR) systems at the expense of weapons for close-in combat. In this regard, Dubrov's failure to consider the AIM-9L may stem from his sole concentration on expanded firing opportunities made possible by "medium-range" missiles and from his apparent reduction of all-aspect weapons employment to launches taken against the enemy "in the face" rather than from any off-boresight position within the lethal parameters of the missile (including beam attacks and shots from behind the target's wing line).

Even within its own terms of reference, Dubrov's treatment of the all-aspect issue seems off the mark on several important counts. First, given the extensive proliferation of all-aspect missiles like the AIM-7F and AIM-9L throughout the Western tactical fighter forces, it is misleading, to say the least, to maintain that they merely constitute "the wave of the future" and to imply that there is no need to develop appropriate countermeasures against them. On the matter of AWACS support, Dubrov is certainly right to suggest that this would greatly

⁹For example, a Soviet article in 1976 noted how "the first launchings of missiles from maximum range can destroy the enemy even before he detects the interception." Colonel A. Krasnov, "Forestalling by Maneuver and Fire," *Krasnaya zvezda*, June 27, 1976.

enhance the effectiveness of a fighter sweep, particularly if the enemy lacked a comparable capability. But he is quite wrong to insist that an all-aspect missile attack "requires thorough preparation, in which other aircraft must also participate." Although it will generally be assisted by GCI or AWACS whenever these assets are available, the F-15 is capable of detecting and locking up an enemy on the nose quite unassisted as far out as 50 n mi and engaging it head-on—once within range—with both the AIM-7F and AIM-9L (assuming that adequate target identification or prevailing rules of engagement would permit clearance to fire).

Second, it is true—as Dubrov notes—that an AIM-7F attack can be negated by appropriate countermaneuvering, but for this to occur the defending pilot must know he is under attack and have visual contact with the incoming missile. He may or may not enjoy this luxury in a heavy electronic warfare environment. It is also true in principle—as Dubrov states—that the attacker must possess appropriate target data and arrive at a firing solution before the enemy becomes alerted if any front-aspect shot is to achieve its maximum possibility of success. Yet the results of the various Beka'a Valley MiG encounters suggest that precisely this occurred on many occasions. It is a fair presumption that many Israeli AIM-7F shots caught their Syrian targets completely off guard—and an in-parameters AIM-9L shot is hard to counter even by the best pilots once the missile leaves its rails. Even assuming that defending fighters could deny the attackers a monopoly on timely target data, this would be of little help in a situation where the attackers had all-aspect weapons and the defenders did not, as was uniformly the case in the Lebanese air fighting.¹⁰

All in all, Dubrov's dismissal of the all-aspect threat and his claim that missile attacks over Lebanon "without transitioning to the maneuvering phase" were exceptions to the rule are strangely at odds with the facts and reflect a basic unfamiliarity with the three cardinal rules of multiparticipant air combat (keep your speed up, avoid a turning fight, and stay unpredictable). Virtually all the IAF's MiG kills were accomplished by AIM-7 and AIM-9 shots. And while Israeli pilots are well trained for close maneuvering combat, the large numbers of aircraft committed on both sides over the Beka'a Valley and the low

¹⁰Beyond that, if the attacker has a front-aspect capability and the defender knows this and lacks a comparable weapon, the attacker can make the defender predictable. In the Lebanese case, according to one report, "some Syrian pilots refrained from engaging in dogfights and simply ejected the moment they knew that the Israelis had spotted them" (Roberts *op. cit.*, p. 163). This hardly squares with the unperturbed view of the all-aspect threat presented by Dubrov.

incidence of reported IAF gun kills make it unlikely that a great deal of hard maneuvering occurred outside of isolated engagements.

Where all this leaves us is unclear, and readers are invited to form their own impressions of the Dubrov piece. On the face of the evidence presented by Dubrov, however, at least one interim conclusion seems inescapable: Either the Soviets have failed to comprehend some of the major tactical lessons suggested by Israel's air combat results over Lebanon, or they are intentionally misrepresenting those results to their aviators for a variety of reasons that we can only guess at. Either interpretation offers ground for guarded encouragement among American fighter pilots.

V. CONCLUSIONS

Despite its impressive advances in weapons technology, the Soviet Union remains a country heavily dominated by institutional drag, organizational compartmentation, and tenacious adherence to culture-bound practices that often perpetuate existing problems rather than encourage their solution. This is true in the military no less than in other sectors of Soviet society. It is one thing to "understand" a situation and something quite different to translate that understanding into meaningful change--particularly in the Soviet armed forces, where deep-seated traditions tend to throw up obstacles in every path. This was forcefully underscored by Viktor Belenko, the Soviet pilot who defected by flying his MiG-25 from the Soviet Far East to Japan in 1976. When subsequently asked by his American interrogators to compare his impression of the U.S. armed forces with his more familiar knowledge of day-to-day Soviet military practices, Belenko cited as an example the dissemination and adaptation of new tactical data. In the Soviet Union, he noted, communication of new information, let alone its exploitation, is slow and difficult because of pervasive secrecy and the burdensome effects of military bureaucracy.¹

This view certainly seems borne out by the way the Soviets responded to their own limited combat experience with the Israelis during their brief MiG encounter against IAF Phantoms and Mirages over the Suez Canal in June 1970. To summarize that encounter, the Soviets showed no familiarity with basic principles of air combat and lost five aircraft in an intense four-minute engagement without laying a hand on their Israeli opponents.² The following day, the Soviet Air Force commander, Marshal Kutakhov, was promptly dispatched to Cairo West in search of the "facts" (and presumably appropriate heads to roll as well).³ Yet it remains far from clear how deeply the lessons of

¹Barron, *op. cit.*, p. 189.

²According to a rare first-hand account of this engagement, the Soviet pilots appeared to panic and break up in complete disorder once the first two MiGs were shot down. In the words of one of the Israeli pilots who participated in that encounter, the Soviets flew into combat "like a bull after a red flag. As though they were knocking their heads against a wall. They were like ripe fruit waiting to be picked." Quoted in Ze'ev Schiff, *A History of the Israeli Army, 1870-1974* (San Francisco: Straight Arrow Books, 1974), p. 200. It goes without saying that the Soviets have never acknowledged this episode. A former Soviet pilot who defected some years later told me that he had never heard of the incident.

³Alvin Z. Rubinstein, *Red Star on the Nile* (Princeton: Princeton University Press, 1977), p. 125.

that experience have penetrated into day-to-day Soviet training in subsequent years. It has been claimed by some that the Soviet Air Force is steadily improving its tactical repertoire in consonance with its ongoing acquisition of advanced fighter aircraft and weapons.⁴ How well it might be able to implement that "improved" repertoire under conditions of actual combat, however, remains an open question, given the rigidities and time-worn conventions that apparently continue to govern Soviet tactical air training.⁵ After all, those Syrian pilots who found themselves so outclassed by the IAF over Lebanon in 1982 were flying front-line Soviet hardware and were operating in accordance with accepted Soviet air combat theory and practice.⁶ Even with all due allowances for greater Soviet professionalism, technical sophistication, and air discipline, there is no *prima facie* reason for believing that the outcome would have been substantially different had the Israelis been flying against Soviet pilots rather than Syrians.

It is against this backdrop that Colonel Dubrov's article must be considered. By itself, it provides far too little evidence to support any confident conclusion about what "lessons" the Soviet Air Force has absorbed from the Lebanese air war. (Indeed, the very question of how the Soviet military assimilates "lessons" from its own and others'

⁴According to a Defense Department report, "the Soviets have recently made significant changes in their air combat tactics and training programs. Pilot independence and initiative are now stressed. . . ." *Soviet Military Power* (Washington: U.S. Government Printing Office, 1983), p. 43. Although we have abundant reason to be concerned about technical trends in Soviet fighter weapons development, the combined record of Soviet writings on pilot training, the Syrian debacle over Lebanon, and Soviet operational conduct leading up to the downing of Korean Airlines Flight 007 suggest that this assertion is considerably overdrawn.

⁵A former USAF Aggressor Squadron commander well acquainted with enemy weapons and tactics has put forward what, for me, is the last word on Soviet air combat prowess until available evidence clearly points the other way: "Exactly how good is the enemy? Is he a ten-foot giant? Not exactly. In fact, without exaggerating, one could place him in the mediocre to poor category when it comes to air combat capability. Certainly his equipment has not improved at nearly the rate ours has. . . . Most important, however, Soviet training is so inferior to ours that this could well be the deciding factor in the outcome of the next conflict." Lt. Col. Mike Press, "Aggressor Reflections," *USAF Fighter Weapons Review*, Summer 1981, p. 4.

⁶By all indications, the Soviets routinely export their operational style along with their arms transfers to client states. One Western observer noted after the Lebanon war how the Syrians, despite their possession of modern Soviet weapons, were apparently hampered by the "highly centralized and unimaginative Soviet tactics that accompany that equipment." Friedman, *op. cit.* A similar view was expressed by the former technical editor of the IAF's magazine, *Bita'on Chel Ha'avir*. "Soviet doctrine calls for wave assaults by fighters to substitute for the denial of airspace to the enemy by missiles. . . . The Syrians sent their air force up by the book, maintaining some 100 fighters in the air in an attempt to frustrate Israeli air strikes. . . . Their tactics and operational procedures were very close to those of Soviet Frontal Aviation." Yosef Bodansky, "In the Wake of Lebanon: The Soviet Union in the Middle East" (Washington: Jewish Institute for National Security Affairs, September 1982), pp. 1-2.

combat experiences is a complex one that warrants close examination in its own right.) All we can say for sure is that Dubrov's article accurately reflects what the Soviet leadership has chosen to communicate about that war to its officers. To go much beyond this would require detailed information about trends in Soviet tactical concepts, training practices, and patterns of aircr⁷ew supervision and management—information which the Soviet armed forces unfortunately are not generally disposed to share with outsiders.⁷

Taking at face value what Dubrov has indirectly told us in communicating with his own fighter community, the worst-case interpretation is that Soviet military leaders have fully understood the handwriting on the wall from Lebanon and have chosen to keep their aircr⁷ews blissfully ignorant while they seek to develop and validate appropriate countermeasures. A less alarmist appraisal would maintain that the Soviets are incapable of facing up to conclusions that would force them to alter fundamentally their reliance on rigid top-down control and have failed to comprehend the essence of the Bekaa Valley experience because of the inhibiting bonds of their entrenched biases and preconceptions.

My own view inclines toward this latter interpretation. Granted, the Soviets are as capable as we are of reading the technical results of the Lebanese war and drawing appropriate technical conclusions. They, like ourselves, are aware that the AIM-9L was a star performer (notwithstanding Dubrov's silence on the matter), and they are undoubtedly well along toward developing a comparable weapon. Likewise, the Soviets learned to their consternation what the USAF itself was gratified to see confirmed, namely, that the F-15 and F-16 are unsurpassed fighters when properly supported.⁸ These and similar

⁷Occasional glances into Soviet operational practice can be found through a careful study of the cost of things Soviet pilots and controllers routinely complain about. For example, in commenting on the rigidities of Soviet tactical training, one Soviet pilot some years ago pointed out that while "it is all very well that GCI operators should assist us fighter pilots, . . . one should not rely on their support for everything." Captain A. Potemkin, "Respond to the Situation," *Aviatsiya i kosmonavtika*, No. 12, December 1975, p. 15. Senior Soviet officers also periodically give vent to such frustration. The Soviet air commander for the North Caucasus Military District, in criticizing an exercise failure that stemmed from blind pursuit of rote procedure and an incapacity for improvising, found his pilots for having "simply not thought out the situation. How can someone go into real combat," he lamented, "without the necessary skills?" Lt. Gen. A. Pavlov, "The Inexhaustible Reserve," *Krasnaya zvezda*, August 1976. The best evidence, however, suggests that despite such expressions of disaffection, the problems that they address only change slowly when they change at all.

⁸It has been publicly reported that the IAF maintained a 100 percent mission-ready rate for its F-15s and F-16s throughout the Bekaa Valley fighting ("U.S. Arms Used in Lebanon Outstrip Soviets," *op. cit.*). This performance record drove a stake through the heart of the argument, most vocally propounded in James Fallows, *National Defense*

conclusions have been well appreciated by the Soviet defense bureaucracy and can almost certainly be expected to influence Soviet weapons characteristics in multiple ways—none of them congenial to Western security interests.

Yet to accept such narrow technical findings as the major teachings of the Lebanon air war would be to overlook the larger implications of its outcome. The real "lessons" of the Bekaa Valley do not concern weapons so much as concepts of force employment. In the end, the Soviets saw the bitter results of a confrontation between two radically divergent military philosophies, in which the Syrians were simply outflown and outfought by vastly superior Israeli opponents. Without question, its sophisticated American hardware figured prominently in helping Israel emerge from the Bekaa Valley fighting with a perfect score. Nevertheless, the outcome would most likely have been heavily weighted in Israel's favor even had the equipment available to each side been reversed.⁹ At bottom, the Syrians were not done in by the AIM-9L's expanded launch envelope, the F-15's radar, or any combination of Israeli technical assets, but by the IDF's constant retention of the operational initiative and its clear advantages in leadership, organization, tactical adroitness, and adaptability. This is the overarching "lesson" of lasting significance from the war—and the last one the Soviets seem close to comprehending and assimilating.¹⁰

(New York: Random House, 1981), that there is an inverse correlation between the sophistication and operability of modern fighter aircraft. But the qualification about adequate support remains critical in explaining the IAF's success on this count.

⁹Senior IDF commanders would probably agree with this judgment. As one indication, when asked what Israel learned from Syria's use of the MiG-25 in Lebanon, Lt. Gen. Eitan replied: "Answering that question is difficult, because the Syrians don't know how to fly or operate the MiG-25. If we could have been sitting in a MiG-25, nobody could have touched us" ("We Learned Both Tactical and Technical Lessons in Lebanon," *op. cit.*, p. 102). Although Israeli planners deeply value the advantages provided by their American equipment and are determined to maintain as sophisticated a force as they can afford, emphasis on the primacy of the human variable remains a core premise of their military doctrine. Their attitude on this score is perhaps best captured in the following remark made some years ago by former IAF commander Ezer Weizman: "The human factor will decide the fate of war, of all wars. Not the Mirage, nor any other plane, and not the screwdriver, or the wrench or radar or missiles or all the newest technology and electronic innovations. Men—and not just men of action, but men of thought. Men for whom the expression 'By ruses shall ye make war' is a philosophy of life, not just the object of lip service." *On Eagles' Wings* (New York: Macmillan Publishing Company, 1976), p. 178.

¹⁰Reinforcement for this conclusion can be found in Moscow's approach toward strengthening Syria's combat arms in response to their battlefield experiences gained in Lebanon. This effort has featured numerous hardware improvements (especially in the realm of electronic warfare) but has entailed virtually no changes in Syrian training or force employment doctrine. See Anthony H. Cordeaman, "Syrian-Israeli CI: The West's Third Front?" *Armed Forces Journal International*, March 1984, pp. 87-90.

None of this should be read as an excuse to underestimate the Soviet Union as an adversary in the large. If only because of their quantitative strength and their apparent indifference to attrition as a necessary price for operational success, the Soviet armed forces have the capacity to create profound problems for NATO—whatever tactical weaknesses they may suffer in the small. Moreover, the Soviet Air Force's reliance on GCI and its lack of refined air combat skills may not be perceived as a liability by Soviet commanders given the way they intend to fight.¹¹ Considering the subordination of Soviet tactical airpower to the imperatives of achieving victory in the land campaign, the Soviets may be quite content to be the losers in an air-to-air slugging contest, so long as Frontal Aviation succeeds in holding off NATO's counterair fighters long enough to allow Warsaw Pact ground forces to accomplish their objectives on schedule. For this reason, Soviet failure to develop an air combat repertoire comparable to ours should not be viewed in isolation as grounds for great optimism by NATO commanders and planners.

Nevertheless, if Soviet pilots genuinely believe and are prepared to act on what they have been told by Dubrov (about the insignificance of the all-aspect missile threat, about the continued validity of "tried and tested" tactical principles, and so on), this can only come as good news to USAF and NATO pilots who may someday have to confront their Soviet opposites flying the SU-27 and MiG-29. The axiom that "you fight like you train" applies to the Soviets no less than it does to ourselves. Only the foolish or the naive would flatly assert that the Soviet Air Force will never absorb the lessons of Lebanon in a manner that might allow it to operate its emerging generation of fighter weapons to the limit of their designed performance. Until that occurs, however, there is great merit in Jasper Welch's admonition that "there is a certain unbecoming fatalism about routinely allowing the Soviet military a free ride on its existing vulnerabilities just because we 'might' be wrong or they 'might' fix them."¹² For the moment, however impressive the emerging Soviet tactical air posture may appear on paper, the

¹¹There is a tendency in the West to regard this regimented Soviet approach to air combat as a significant operational deficiency. For some circumstances, that may be a valid assessment. Yet the Soviets may not see matters that way. Two senior RAF officers, M. J. Armitage and R. A. Mason, have cautioned that the Soviet Air Force appears to regard "centralized command and control not as a potential weakness which would induce rigidity or reduce local initiative, but as a means of deriving the greatest possible flexibility to concentrate forces over great distances whenever it should be required." *Air Power in the Nuclear Age* (Chicago: University of Illinois Press, 1983), p. 176.

¹²Maj. Gen. Jasper A. Welch, Jr., USAF, "The Role of Vulnerability Analysis in Military Planning for Deterrence and Defense of Invasion Threats to NATO" (unpublished paper, June 1976).

individual Soviet fighter pilot still has a considerable way to go before he is allowed the training and latitude to employ his equipment to its fullest potential.

Appendix

AVIATION IN THE LEBANON CONFLICT¹

Colonel V. Dubrov

The piratical attack of the Israeli militarists against Lebanon and Palestinian refugee camps in June 1982 riveted the attention of all progressive mankind. Never before had the Zionist usurpers conducted themselves with such brazen impudence and cynicism. Israeli soldiers trampled the soil of a peaceful country and brought death and destruction to its towns and villages. Violating the norms of international law and leaning on the support of its Washington patrons and inspirers, the Tel Aviv leadership transformed the territory of a sovereign government into a proving ground for the testing of American arms and new combat technology, including aviation.

Air operations in this armed conflict have deeply interested foreign military specialists. The Israeli aggressors introduced new American-made F-15 and F-16 fighters into combat, along with third-generation Sparrow and Sidewinder air-to-air guided missiles.

It would not be out of place to take a short digression back to events ten years ago and recall the aerial aggression of the USA against the Democratic Republic of Vietnam.

The territory of Vietnam, as is known, has its eastern border facing the sea and runs north and south. This had a direct impact on the character of American air operations. Fighter-bombers (and later, strategic bombers) launched out of air bases in Thailand in large formations, carrying hundreds of tons of bombs into the area of Hanoi and Haiphong. Accompanying groups of fighters followed behind in standard combat formations. Positioned in zones over the ocean outside the range of antiaircraft fire were platforms for jamming air defense radars, as well as Air Force and Navy airborne command posts (the EC-121 and E-2A) with long-range radar scanning capability. To protect the main strike force in the immediate target area, fighters were

¹Aviatsiya i kosmonavtika (Moscow), No. 9, September 1983, pp. 46-47, and No. 10, October 1983, pp. 46-47. Translated by Benjamin S. Lambeth, The Rand Corporation, Santa Monica, California, 1984.

launched to create cover and seal off the area from possible penetration by North Vietnamese MiGs.

Now we can reconstruct for comparison the situation a year and a half ago in the Middle East. The narrow territory of Lebanon also borders the sea (only along its western side) and likewise runs north and south. Israeli fighter-bomber groups departed their bases in flight and squadron strength and proceeded north toward the area of Beirut. Awaiting them in prepositioned zones over the sea were E-2C Hawkeye long-range radar scanning aircraft. Groups of F-15s and F-16s were deployed a bit closer to shore within patrol zones, positioned eastward to provide a multilayered CAP before the ingress of the main strike package into the target area.

Foreign military observers note a striking similarity between these two models. And this is entirely understandable. The Israeli aggressors had someone from whom to draw examples in working out their tactics and from whom to borrow analogies for the positioning and employment of their forces. They also had someone from whom to buy the modern air technology needed for carrying out their combat operations. It is not hard to see that all the aircraft mentioned above are of American manufacture. Changes in tactics have been minimal. These consist mainly in a departure from the use of direct escort in favor of employing a separate combat air patrol of F-15s and F-16s.

As a means for protecting the strike force, the combat air patrol is not new. It is one of a variety of ways to sterilize airspace. In this instance, fighters set up a barrier along the axis of probable approach by the enemy. During actual combat operations, the positive and negative features of the CAP became apparent. On the positive side, foreign specialists point to the freedom of action gained through splitting the fighters away from direct support of the larger formation of bombers. Since they are no longer subordinated to the strike group, they can perform not only defensive but also offensive combat. (By defensive combat we mean repulsing enemy attacks while simultaneously maintaining position within the combat formation.) Fighters freed up in this manner now work together in providing protection for bombers either through prebriefed time coordination or through radar contact. However, they must redeploy against enemy fighters and engage in combat by relying on the commands of a direction center.

One negative feature of the CAP is the necessity for maintaining positive radar control outside the strike zone and its approaches for the entire time these areas are being overflown. As events in the Middle East demonstrated, this is not a simple task, especially given the presence of such varied depth. Another negative aspect, not quite so readily apparent, has to do with the diminished reliability of the CAP

in comparison to direct accompaniment (escort) of bombers, along with the vulnerability of a fighter "barrier" to fire from surface defenses over enemy territory.

These negative features uncovered during the Lebanon air war were dealt with by the Israeli command in the following manner. Continuous radar control over the battle arena was accomplished according to the American model, using long-range radar aircraft operating as airborne command posts. E-2C Hawkeyes scanned the airspace over Lebanon and managed the movement of fighter CAPs. The invulnerability of fighters to surface defenses was accomplished from the outset through the jamming of ground radars by a Boeing 707 (modified by Israeli industry from a passenger liner). In addition, before being inserted into combat, fighters were positioned in zones safely removed from the outer envelope of ground-based antiaircraft fire. To ensure its own invulnerability, the Hawkeye airborne command post situated itself even farther away from shore. This complied with the official view of the American command regarding proper deployment of airborne command posts during operations. In the present case, the Israelis first of all took into account that long-range radar aircraft lack their own means of protection against fighters--namely, defensive weapons and on-board ECM gear. Second, the on-board scanning equipment of these aircraft can pick up airborne targets out to a distance of over 300 km looking down into the lower hemisphere. Accordingly, with the Hawkeye deployed some 100 km offshore, it could monitor the entire territory of Lebanon and an adjacent portion of Syrian territory at all altitudes.

The way in which forces were positioned before commencement of large-scale air combat (with the combat formation) closely matched, in the view of foreign specialists, the combat capabilities of the new fighters and the type of tasks they were built to carry out. This positioning entailed almost identical features throughout the entire course of combat operations: a mixed formation of groups of F-15s and F-16s, an airborne command post, and an ECM aircraft. The latter aircraft never changed position during the entire dynamic of battle, but instead remained constantly on station in their designated patrol zones.

The more mobile part of the combat formation consisted of groups of F-16s designed for close-in maneuvering combat. Built especially for this function, they embody distinctive aerodynamic, tactical, and handling characteristics as well as lightweight fighter ordnance. The less maneuverable portion consisted of groups of F-15s, whose main tasks were air surveillance over the battle zone and achievement of local superiority. The pilot conducts air surveillance with his on-board APG-63 radar (capable of detecting airborne targets in the upper

hemisphere out to a range of more than 80 km) and seeks local superiority through both the performance characteristics of his aircraft and the AIM-7F Sparrow medium-range (5-50 km) guided missile.

The width of the battle formation was defined by the span of two or three fighter CAPs spread out along a front, and its depth by the distance between the patrol area of the Hawkeye AWACS (or the Boeing 707 jammer) and the eastern border of Lebanon. According to data from the foreign press, Israeli manned aircraft did not penetrate Syrian airspace. Exceptions were flights of pilotless reconnaissance aircraft of various types.

Before actual ingress into Lebanese territory by Israeli strike groups (fighter-bombers and close-support aircraft), the entire combat formation assumed a multilayered arrangement outside the immediate combat area. F-16 lightweight fighters were positioned at the bottom. Medium altitudes were occupied by the Hawkeye AWACS and F-15s. Above these (and farthest seaward) was the Boeing 707 jammer. The AWACS usually had a pair of F-15s providing direct cover.

Each element of the combat formation fulfilled its respective assignment, but operations by all were coordinated and subordinated to the overall plan. Direction, vectoring, and transmittal of information were all handled by radio. Automated command and control links existed only in the battle management system involving the low-speed Scout and Mastiff reconnaissance drones. Radio transmissions between fighters in the combat formation were tightly disciplined and strike frequencies were left open to the maximum degree possible for use by the airborne command post in directing all aircraft operating within the combat area or its approach corridors. "Blind" zones in the field of view of the Hawkeye AWACS created by the mountainous topography of Lebanon were compensated for by the F-15's search radar, which was capable of breaking out airborne targets against ground clutter out to a range of about 50 km. To accomplish this, the F-15 would move its patrol zone closer in toward the combat area.

During the search phase, the responsibilities of the pair were usually split up this way: One pilot led the search in the upper hemisphere, while the second, following in a line-abreast position about 1000 meters out, scanned the lower hemisphere (the overall sectors of search being 60 degrees up and down). The fighters themselves during this search remained under radar control of the AWACS, which communicated advisories about their threat situation.

During combat, fighters generally followed directives from the AWACS. The airborne mission commander, positioned in front of the main console screen (with a diameter of 25.4 cm), exercised control and situation analysis with the aid of on-board computer equipment which

processed incoming radar data. Real-time information provided by this system made possible the fulfillment of assigned combat tasks by the fighters. Unidentified airborne targets were denoted by special symbols, along with friendly fighters and targets representing the greatest threat. Upon selecting a group to carry out an intercept and committing it to battle, the computer equipment would resolve the intercept geometry and generate information on the screen regarding the speed, altitude, and range of the target. The operator then communicated this information to the commander of the fighter group located within the actual patrol zone. The fighters then took up the assigned heading and assumed autonomous search for the enemy during the convergence phase.

Pairs of F-16s, inserted into combat at the outset of the convergence phase, let down to the lowest possible altitude to escape radar detection by the enemy. If, during this time, they flew into sectors unmonitored by the airborne command post, they received target designation information from crews of the F-15s. As pointed out by foreign military specialists, this was the first time such interaction between fighters had ever been practiced. This interaction was brought about by the need for constant radar control over all crews in the battle formation from the beginning to the end of combined air combat without exception. Before closure, the pilot received information about the presence or absence of a threat from enemy fighters. When fighters were converging at medium or high altitudes, the use of direct deception and decoying was ruled out. Stealth in this situation was achieved instead by the use of active radio and radar jamming from the Boeing 707 or by means of mobile ground stations located on mountaintops.

Decisions regarding committal of the F-15 to combat hinged first of all on the employment capability of its medium-range weapons—the AIM-7F guided missile. This weapon has a semiactive radar homing system and therefore is sensitive to the maneuvers of the target. If the target remains steady or course for even a short length of time, its lock-on and tracking are assured by on-board radar illumination, and the radar seeker in the missile head will work reliably. Violent changes in the target's course (featuring large heading angles) or altitude (featuring a sharp rate of descent) can cause a break-lock. But the F-15 can still press on into close combat, because it also carries the short-range AIM-9L Sidewinder. This represents a departure from the traditional advantages usually associated with an "air superiority" aircraft—attacks made possible from medium range. Because of this, the probability of being shot down grows. The F-15, full of complex electronic equipment, is more than twice as valuable as the F-16, designed solely for close-in combat. This in itself constitutes a significant deterrent factor.

According to data describing the capabilities of the F-15's APG-63 radar, the maximum range for illuminating an airborne target in the upper hemisphere (greater than 80 km) is twice that of its capability in the lower hemisphere. From this logically flows the advisability of attacking from below looking up and straight ahead, meeting the enemy head-on ("in the face," in the expression of foreign specialists). Conditions for such an attack can be created either by a single aircraft or by a diversionary group, which by means of certain maneuvers can "sucker" the enemy into a desired spatial position. It is from this, in the view of foreign specialists, that arises the need for a new type of combat formation enabling freedom of movement up and down while maintaining mutual support. The strike group is now positioned below and the decoy group above, with freedom of both vertical and horizontal maneuver to make possible evading the enemy and initiating pursuit.

Combat formations involving similar responsibilities among diverse groups with various mission taskings are not new but have only been further perfected. In the series of articles under the general heading "How Has Air Combat Changed," published in *Aviatsiya i kosmonavtika* in 1978, formations consisting of decoy, reserve, and strike groups were analyzed. There, reference was also made to Phantoms attacking from below from an ambush position in the air. However, that analysis dealt only with combat by second-generation fighters which could not carry out a frontal attack "in the face," but instead had to position themselves in the rear hemisphere of the target to employ their short-range weapons.

Foreign specialists maintain that the all-aspect attack, in spite of its complexity and dependence on various complicating factors, has asserted itself as a new element in air combat tactics. This may be the wave of the future. For the present, such an attack requires thorough preparation, in which other aircraft must also participate. It is further compounded by limitations imposed by the target, which normally will not be inclined to cooperate by flying in a straight line. Moreover, it remains necessary for the attack group to acquire target data before this information is received by the other side. During combat sorties using F-15s (the first of which occurred in 1979), the role of target search was delegated to the AWACS.

Foreign specialists hold that coordination of an attack along the interception course (from the frontal hemisphere) using short-range weapons will be the principal distinguishing feature of air combat in the 1980s. Conjoint employment of multiple aircraft types carrying these weapons and the task of escorting strike aircraft will govern the overall complexion of combat.

The practical side of this conclusion derives from an established fact: Aircraft and weapons are ready to carry out maneuvering combat.

What is left is the preparation of the pilot. All the basic propositions of group maneuvering combat theory and practice formulated during World War II are well known. Each subsequent generation of fighter aircraft has added to and perfected these propositions. But the main idea remains unchanged. Looking for some "new in principle" way of training, in the view of experts, is a waste of time.

II

The mass production and trade of arms is the source of the legendary profit-making of the American military-industrial complex. In the race for superprofits, the bosses of firms that have made fortunes on the development of various types of death-dealing products on order of the Pentagon are working out ever-newer weapons. An important place in this huge mass of weapons and technology is taken up by the newest aviation and electronic warfare equipment which was put to the test in the skies over Lebanon.

According to the foreign press, the lightweight F-16 (without medium-range missiles) was the most intensively used fighter in combat over Lebanon in 1982. Forward-hemisphere attacks without transitioning to the maneuvering phase were episodes heralding the future but were not typical fighter tactics. The following lesson was confirmed: Radar control over fighters weakens with increasing depth into enemy territory and the probability of sudden attack increases, producing conditions for maneuvering combat. Air superiority is fundamentally achieved by shifting the battle to the enemy rather than over one's own territory. (The latter means losing the initiative in the struggle for superiority.)

The warning system incorporated in all fighters informed the pilot when his aircraft was being tracked by enemy radar and when a missile was launched. The pilot would then instantly execute a hard maneuver and simultaneously eject a flare, which upon being released from the aircraft would emanate an even stronger heat signature than that of the aircraft. The seeker head would accordingly shift and steer the missile in a false direction. The fighter's warning system was capable of automatically transmitting signals for the release of flares (located in an internal fuselage container) without intervention by the pilot.

Electronic systems were heavily employed in the air combat arena. Besides intensive radio and radar jamming by the Boeing 707 and by ground stations set up on Lebanese territory, there were also electronic warfare suites aboard combat aircraft. The F-15 and F-16 (the latter in a pod variant) carried active jamming systems linked to incoming

signal processors. This equipment determined the greatest relative threat, measured the signal frequency, and selected the appropriate disorientation interference, using data on the direction of the threat source for concentrating force in space.

In this way, the on-board jammer automatically locked onto any threat that presented itself and directed disruptive signals toward the enemy. Modulation of the output multiplied manyfold the effectiveness of electronic countermeasures in comparison with older transmitters. Besides active means for forcing a break-lock on radar-guided missiles, chaff reflectors (passive countermeasures) were also employed. On the F-15 and F-16, they were stored—like the flares—in special cartridges located in internally mounted fuselage containers. After receipt of radar pulses from the system guiding the missile, they would be ejected, forming a dense cloud that provided a dummy signal return. The probability of shifting the course of the incoming missile toward the chaff cloud hinged on the interaction of these factors: comparisons between the effective reflecting surface (radar cross-section) of false and real targets; improved signal processing capability for determining angle-rate; and the timeliness and correctness of the maneuver for getting an aircraft out of the threat radar's illumination zone. For greater effectiveness, the chaff reflectors should be ejected instantly and in such a way as to present the enemy with an unsolvable radar picture.

Changes also have occurred in the means of conducting aerial reconnaissance. The Israeli command intensively employed pilotless reconnaissance aircraft (RPVs). The tendency to substitute these for piloted aircraft was established earlier during the air war in Southeast Asia, where RPVs carried out over 3000 combat sorties in all. The introduction of unpiloted reconnaissance systems came about first of all because they are cheaper. According to data from the American press, a single modern military reconnaissance aircraft costs around \$10 million, whereas a pilotless aircraft costs only \$1 million. The resultant gains in military capability, according to criteria of cost-effectiveness, are self-evident. Second, RPVs permit economizing on resources that would otherwise be spent on the training and support of pilots and on replacement of combat casualties.

The most widely used RPV in Vietnam was the Teledyne Ryan BQM-34. After studying the results of its use in combat, the Israeli command bought 12 of these systems and used them in the October 1973 war. In contrast to the American approach, whereby the drones were dropped primarily from DC-130 mother aircraft, the Israeli technique envisaged the launch of RPVs by ground catapults. Following the October war, piloted and pilotless reconnaissance platforms

continued to carry out regular flights over the territory of Arab countries. Their quantity in the Israeli Air Force increased.

The BQM-34 RPV mainly did high altitude photography with the aid of a 76 mm focal-length camera.

The small radar signature of the RPV is supposed to render its detection by enemy radar more difficult. Its small dimensions (especially when observed from the rear) and its ability to maneuver at up to 30 degrees of bank and 5 g also make it hard to be visually spotted and attacked by a fighter.

Specialists consider the negative side of the BQM-34 to be its dependence on preprogramming on the ground and the impossibility of its program's being amended in flight. Accordingly, the Israeli Scout and Mastiff RPVs were used for battlefield reconnaissance instead. The modified Mastiff (Mk2) is a light, small-size RPV driven by a 2-cylinder, 14-horsepower piston engine with a fuel capacity of 22 liters. On-board equipment includes a television reconnaissance camera, an aerial photo camera, an infrared sensor for forward viewing, and a laser rangefinder and target designator. Various alternative configurations of this equipment are possible. The principal variant—featuring the television camera—provides a 360-degree view of the earth's surface with a 90-degree azimuth all around.

The Mastiff is launched by a pneumatic catapult mounted on a truck. A command post, located in a container on the truck's chassis, monitors the flight. Commands to the TV are relayed by a radar antenna and data from it come back through a receiving antenna. During the Lebanon conflict, the operator monitored the programmed flight and introduced corrections where necessary. A navigator marked down the actual programmed route of the flight on a 1:12,500-scale map. The ground pilot controlled the on-board TV apparatus. Incoming images were displayed on a 35-cm TV screen and were recorded on videotape, along with accompanying numerical data.

According to reports in *Aviation Week*, the battlefield reconnaissance system included 4-6 RPVs, mobile direction centers, a crew of 7 men, and a launch platform. Besides carrying out its primary function, it was also used to guide ground-attack aircraft against exposed targets and to provide post-strike damage assessment. Target data were provided to strike aircraft carrying laser-guided bombs by a laser rangefinder aboard the RPV, which designated the target with a laser beam. The relatively low cost of this system (\$500,000, comparable to the cost of a single BQM-34) permitted large-scale use of Scout and Mastiff RPVs as decoy targets. Foreign specialists consider obtaining precise real-time information on ground targets a most important factor in air-power application and a major advantage of these battlefield reconnaissance systems recently tested under combat conditions.

Foreign observers consider the neutralization of air defenses at very low altitudes and the increasing scale of guided air-to-surface weapons employment as distinctive features of Israeli strike force operations.

The first distinctive feature depends on the specific nature of the air operations being conducted. In the Lebanon conflict, such operations were carried out over a country that did not have modern antiaircraft systems. Resistance against the aggressor came from antiaircraft artillery units, which were organic to combined Arab forces located on Lebanese soil in accord with an agreement. The localized character of antiair defenses enabled the aggressor to avoid their zones of fire, especially by using the cover of high mountain ridges for terrain masking. Because of this, there was no need for the aircraft to descend to low altitude. (We should recall that low-level penetration was the main tactic employed during the October 1973 war, when Israeli aircraft entered Syrian and Egyptian airspace.)

Operating outside the low-level environment allowed the Israelis to forgo spread-out formations and instead to use close formations, which assured greater strike-force density. The flight split up only moments before ingress to the target for a two-ship attack (with single aircraft coming in from various directions). A raid of the "star" type [meaning unclear—possibly curvilinear attacks from multiple run-in headings] forced a dispersion of fire by air defense forces covering the target area. Dive entry (with a slight angle) commenced at 2500-3000 meters, with a pullout at 1500 meters. The strike was executed on the first pass, without a repeat run over the target. These tactics corresponded to a scheme of attacks developed during earlier local wars, in which conventional (that is, unguided) weapons were used and the lack of aiming precision was offset by the quantity of freefall bombs dropped on the target.

The technique of employing guided weapons differed distinctively from normal group bombing. The higher accuracy of these weapons and the lack of any requirement to put the pipper directly on the target made it possible to avoid committing aircraft in squadron strength. The principle of "each to its own target" applied. Large-scale employment of guided weapons was ruled out, as was the case during the U.S. air aggression in Vietnam, because it was very costly in comparison to ordinary bombing and because munitions stocks were limited. Accordingly, guided bombs and missiles were used only for the most important designated targets.

In light of the capabilities of the Scout and Mastiff RPVs and air-to-surface guided weapons, corrections were introduced into the means of combating ground-based air defenses. The traditional approach used by the Israeli Air Force ("blinding" and "suppressor") was divided into

phases, according to the terminology of Western observers. The first phase—launch of decoy targets—entailed the periodic incursion of cheap RPVs into the zone of antiaircraft fire. This phase lasted several hours, with the goal of keeping the target in constant suspense and physically wearing out the enemy's air defense crews. The second phase—blinding—was fulfilled by passive and active radar counter-measures stations, which created conditions for the undetected penetration of aircraft to their strike objectives. The third phase entailed the actual approach to the target by aircraft carrying PGMs, using guided bombs and rockets to attack vitally important components of the enemy's air defense forces. The fourth phase—suppression—was carried out by groups of fighter-bombers covering target sectors using conventional weapons. (The most common of these were cluster bombs filled with small 500-gran. submunitions, which at impact had a killing effect over a sector 25 times larger than that covered by a 240-kg high-explosive bomb.)

As emphasized by foreign observers, dividing up the overall raid into this sequence of phases is somewhat arbitrary, since there is obviously no constancy among such parameters as time, space, and strike objectives. For this reason, it is not possible to rely on any set means for carrying out such strikes. For example, a large raid in combat against ground-based enemy air defenses this time was carried out by an unguided large-caliber surface-to-surface missile called "Wolf" by the foreign press. Target coordinates were introduced into its guidance system and the weapon could then be fired to a range of about 40 km. This missile was the most devastating weapon of all. The unusual positioning of air defense assets right on the "front line" in Lebanon permitted the application of this technique for conducting a strike, which would have been infeasible or inappropriate in different circumstances.

Aside from the employment of RPVs as fake targets and as a means of target designation and steering for guided bombs and missiles carried by strike aircraft, foreign specialists do not identify any new features in these successive phases. They particularly stress that all the guided weapons—Shrike, Standard ARM, Walleye, Maverick, and winged bombs—supplied to Israel by the USA were already tested during the closing period of the air war in Vietnam. The argument about their use in Lebanon outside the engagement range of ground-based air defenses has been cast into doubt by foreign experts, since their stand-off distance to secure the required aiming accuracy, according to the experience of Vietnam, could not exceed 13-16 km. This especially applies to the Shrike and Standard ARM missiles with passive radar-homing systems.

One of the key advantages of the guided munition is its high accuracy. This reduces the amount of manpower needed to engage a single target. But this economy (reducing cost while preserving effectiveness) is achieved only with a sufficiently complex organization for combat support. Aircraft carrying guided ordnance need only suppress the medium-range air defenses in the target area and have accurate real-time data on the target's location. It is deemed unwise for an aircraft with expensive externally mounted weapons to conduct independent search in zones in which air defenses have not been suppressed. The loss of such an aircraft would be far more costly than the munition required for destroying any target of tactical significance to the enemy. Therefore, target hunting was carried out by cheaper auxiliary means (R&Vs) by the Israelis in Lebanon.

There is yet another factor which foreign specialists recommend giving close attention in the analysis of modern combat experience: Local wars often constitute "proving grounds" for the development of novel air combat weapons. We can cite examples of combat performance evaluation beginning with the USAF F-111 and A-7D; bombs with laser, electro-optical, and infrared means of guidance; and electronic countermeasures that were all tested in Vietnam. We may add to that the introduction of the F-15 and F-16 into combat by the Israeli Air Force in the Middle East. To create optimum conditions for such testing, circumstances can sometimes be artificially simplified or, on the other hand, rendered more complex, as proved to be the case in last year's armed conflict in Lebanon. For this reason, foreign observers recommend that local wars be studied critically. This means first and foremost giving them cautious and careful scrutiny and taking into account the appropriate qualifications before applying the analysis to other situations.

In the final analysis, and this warrants underscoring, the Washington purveyors of death and their Tel Aviv disciples are not concerned in the least that the weapons produced in the military factories of the United States and Israel are contributing to the deaths of thousands of peaceful people. The Israeli warmongers, blinded by their Zionist propaganda and urged on by the Pentagon, are testing new weapons—including those related to aviation—under realistic conditions. But nothing can break the Lebanese people, who are striving for freedom and independence. With the help of the world's progressive forces, the power of their resistance against the Zionist hangmen is gaining strength day by day.